TI 2-NDC/TNG-1

TECHNICAL MANUAL

INSTALLATION, OPERATION, PRINCIPLES OF OPERATION, MAINTENANCE, ILLUSTRATED PARTS BREAKDOWN, AND SYSTEM DIAGRAMS

UNITED STATES NATIONAL DATA CENTER TRAINING SYSTEM

LIST OF EFFECTIVE PAGES

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GLOSSARY

| TERM | DEFINITION | TERM | DEFINITION |
|---|---|---------------------------|---|
| AFTAC | Air Force Technical Applications Center | SCSI | Small Computer System Interface |
| COTS | Commercial Off-the-Shelf | Shutdown | Procedures performed on system software |
| COTS CPU DLT DoD ESDS GAPL GB GUI Hz IAW IPB ITI LAN LRU MFR MSDS OSHA PMI/PMRs | • • | Shutdown TI TO UPS US NDC | |
| | Maintenance Routines | | |
| RAID | Redundant Array of Independent Disks | | |
| REF. DES. | Reference Designator | | |

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INTRODUCTION

This technical instruction (TI) contains the data necessary for an instructor to maintain the United States National Data Center (US NDC) Training System. It includes the information outlined below. This manual does not include instructions on operating the US NDC equipment unless the procedure is unique to the Training System. All operating instructions are contained in TI 2-NDC-1 which should be used in conjunction with this manual.

Chapter 1 describes the equipment and its purpose in general terms. Publications related to operation of the equipment are also identified.

Chapter 2 contains Training System startup procedures.

Chapter 3 provides operating procedures required specifically for the US NDC Training System. All operating procedures common to both the US NDC Operational System and the Training System are provided in TI 2-NDC-1.

Chapter 4 discusses the detailed principles of operation for the US NDC Training System from a functional viewpoint. Also included is a description of the processes and data flow.

Chapter 5 contains troubleshooting procedures and removal and replacement procedures for proper maintenance of the US NDC Training System hardware and software.

Chapters 6 presents the illustrated parts breakdown (IPB) from a top level.

Chapter 7 contains US NDC Training System diagrams and wiring tables. This chapter also contains the information necessary for proper setup of the Training System equipment.

Appendix 1 contains a cross-reference list of machines contained in the US NDC Training System, listed by both their functional name and their node name.

Appendix 2 provides disk partition tables for the Training System machines.

STANDARD CONVENTIONS

UNIX Conventions

This documentation assumes some knowledge of the UNIX operating system which runs on the workstations. In this document, interactive (typed) input is shown in Courier bold font. Computer prompts and responses are presented in Courier font. Comments are added in parentheses in Helvetica font. The symbol \d is used for <enter> or <return> for keyboard inputs. The following is an example of these formats:

login: username → (Enter username)

Mouse Conventions

The workstation mouse has three buttons: left, middle, and right. In general, use the left mouse button unless specified otherwise.

UNIX File and Path Name Conventions

Throughout the document references to UNIX file names, as well as the path, will be specified in Courier font without italics. For example, /adsn/config/status_monitor.par would refer to the status_monitor.par file in the /adsn/config directory.

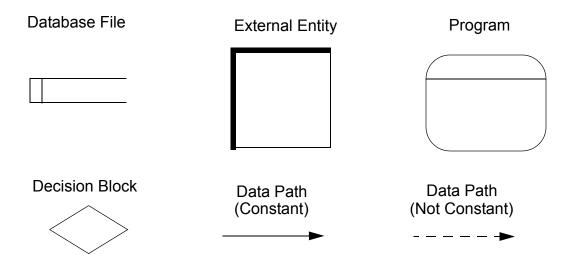
Pull-down Menus

Some procedures contained throughout this document require the operator to select a pull-down menu, then select an item within that pull-down menu. When this occurs, the menu item to be selected by the operator appears in **Helvetica bold** font, immediately followed by a double arrow signifying the pull-down menu, immediately followed by the next selection also in **Helvetica bold** font. The following is an example of this format:

a. Select File⇒Open⇒Latest Interval for AL1 in ARS.

Graphic Symbol Conventions

The following graphic symbols are used in the data flow diagrams contained in this manual.



SAFETY SUMMARY

This publication describes procedures which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the Material Safety Data Sheet (MSDS) Occupational Safety and Health Act (OSHA) Form 20 or equivalent from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials.

The following are general safety precautions, sample icons, and instructions personnel must understand and apply during the many phases of operation and maintenance to ensure personal safety and health and the protection of Department of Defense (DoD) property.

HAZARDOUS MATERIALS

Warnings for hazardous materials are designed to warn personnel of hazards associated with such items when they come in contact with them during actual use. For each hazardous material used, a MSDS is required to be provided and available for review by users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures.

WARNING AND CAUTION STATEMENTS

Warning and caution statements are strategically placed throughout this text prior to operating or maintenance procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A warning or caution will apply each time the related step is repeated. Prior to starting any task, the warning or caution included in the text for the task shall be reviewed and understood. The following are examples of warnings and cautions used throughout this document:

WARNING

This instrument produces lethal voltages. Remove all jewelry, watches, and wire rim glasses before working on this instrument. Ensure that power is disconnected before replacing any parts or performing maintenance. Procedures involving lethal voltages are identified by the following symbol:



CAUTION

HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES

Electrostatic discharge sensitive (ESDS) devices must be handled with certain precautions that must be followed to minimize the effect of static build-up. Consult MIL-STD-1686B. Procedures involving ESDS devices are identified by the following symbol:



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CHAPTER 1

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. Chapter 1 provides general information for the United States National Data Center (US NDC) Training System.

1-3. DESCRIPTION AND PURPOSE.

- 1-4. The US NDC Training System is a stand-alone network used to conduct seismic analyst training. The Training System provides pre-recorded, pre-processed seismic and hydroacoustic data to conduct basic seismological training in signal detection, post-detection processing, phase identification, event formation, location, and magnitude. Training software used is a subset of the operational software from the US NDC system.
- 1-5. As shown in figure 1-1, the Training System consists of hardware and software to support a training atmosphere similar to the analysis capabilities of the operational environment. The system is an integrated suite of computers, software and related equipment used to conduct seismic analyst training.
- 1-6. Within the training network, an instructor controls assignment of data intervals to students and supervises instructional sessions.

1-7. EQUIPMENT SUPPLIED.

1-8. Table 1-1 lists the equipment supplied for the Training System.

1-9. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1-10. Table 1-2 lists the equipment required to operate and maintain the Training System, but not supplied.

1-11. LEADING PARTICULARS.

1-12. Table 1-3 lists the logistical characteristics and environmental requirements for the Training System. For particulars on individual equipment, refer to the appropriate identifying technical instruction (ITI).

1-13. CAPABILITIES AND LIMITATIONS.

1-14. Table 1-4 lists the capabilities and limitations of the Training System equipment.

1-15. RELATED PUBLICATIONS.

1-16. Table 1-5 lists the publications referenced throughout this technical instruction (TI) which provide additional information on the Training System equipment, as well as information on related equipment.

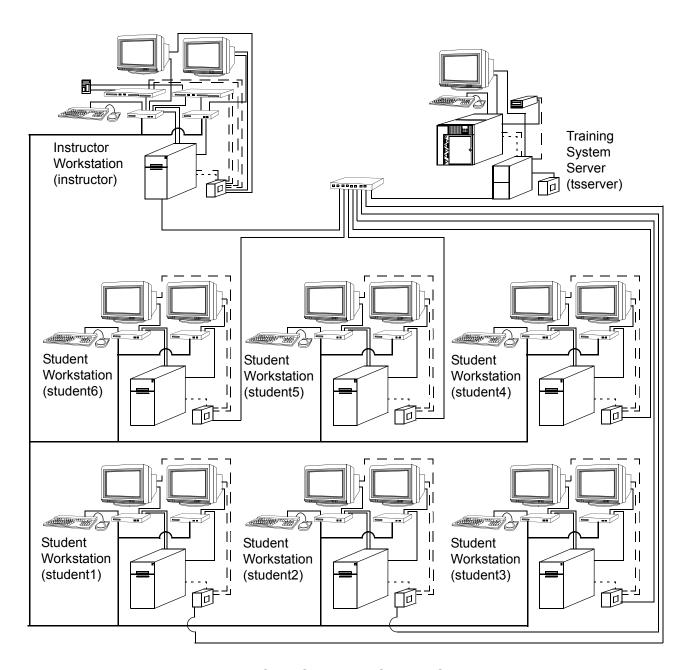


Figure 1-1. US NDC Training System Connectivity

Table 1-1. Equipment Supplied

| ITEM | DESCRIPTION | QTY | APPLICATION |
|------|--|-----|--|
| 1 | HARDWARE | | |
| 1a | Ultra 10/440 P/N Ultra10 | 7 | Provides for interactive analysis of data pulled from the server. |
| 1b | E450 Server P/N E450 | 1 | Provides a host computer platform for the applications software, commercial off-the-shelf (COTS) software, seismic and hydroacoustic data, and student training files. |
| 1c | External Tape Drive, DLT 7000 P/N X6060A | 1 | Provides additional data storage for the server. |
| 1d | 21-in. Color Monitor P/N 365-1399 | 14 | Provides visual display of system screens and reports. |
| 1e | 17-in. Color Monitor P/N 365-1354 | 1 | Provides visual display for the server. |
| 1f | SmartClass 2000 Control Unit P/N SC 2000C | 1 | Provides capability for instructor to monitor student actions and performance and allows instructor workstation to interact with any or all student workstations. |
| 1g | SmartClass 2000 Junction Box P/N SC 2000 JU | 2 | Provides connectivity between instructor and student workstations. |
| 1h | SmartClass 2000 Interface Box P/N SC 2000i SUN | 14 | Provides connectivity between instructor and student workstations. |
| 1i | Cisco FastHub 400 P/N WS-C4212 | 1 | Provides connectivity between server, instructor and student workstations, and the printer. |
| 1j | Uninterruptible Power Supply P/N SU3000NET | 1 | Provides backup power to server. |
| 1k | Uninterruptible Power Supply P/N SU2000NET | 1 | Provides backup power to instructor workstation. |

Table 1-1. Equipment Supplied (Cont)

| ITEM | DESCRIPTION | QTY | APPLICATION |
|------|---|---------------------------|--|
| 11 | Uninterruptible Power Supply P/N BP1400 | 6 | Provides backup power to student workstations. |
| 1m | Battery Pack P/N SU48BP | 1 | Provides additional backup power to server. |
| 1n | Power Supply P/N SC 2000PS | 4 | Provides power to SmartClass 2000. |
| 10 | Laser Printer, Lexmark P/N C710dn | 1 | Provides general purpose print capability of system screens, data and reports. |
| 2 | SOFTWARE | | |
| 2a | US NDC Training System | 1 | Custom NDC software for the preparation and processing of data for use on the Training System. |
| 2b | Solaris Version 8 | Each SUN Machine | Operating system software for the server and each workstation. |
| 2c | Oracle Server Version 8.1.7 | 1 Site License | COTS software providing support for database management and administration. |
| 2d | Scheme Version 2.3 | 1 | COTS software for interfacing with US NDC software. |
| 2e | Acrobat Reader Version 5.0.5 | 1 Site License | Open Source software providing maintenance support. |
| 2f | Netscape Communicator Version 4.76 | 1 Site License | Open Source software providing maintenance support. |
| 2g | ArcView Version 3.2 | 7 Floating Licenses | COTS software to interface with Geographic Information System data; provides an interface to the Knowledge Base geographic data. |
| 2h | ArcView Spatial Analysis Version 3.2.31 | 7 Floating Licenses | COTS software for spatial orientation of each image within ArcView. |

Table 1-1. Equipment Supplied (Cont)

| ITEM | DESCRIPTION | QTY | APPLICATION |
|------|---------------------------|-----|---|
| 2i | GNU GZIP Version 1.2.4 | 1 | Open Source software providing a suite of tools to compress/uncompress files. |
| 2j | PERL Version 5.005_03 | 1 | Open Source software for script development. |
| 2k | APC Powerchute Plus | 8 | Uninterruptible Power Supply (UPS) software. |

Table 1-2. Equipment Required but not Supplied

| ITEM | DESCRIPTION | QTY | ESSENTIAL CHARACTERISTICS |
|------|-------------------------------|-----|---|
| 1 | Standard ESD Equipment | 1 | Used to support ESD precautions for maintenance actions. |
| 2 | Cable Repair Kit | 1 | Suitable for RS-232 cable, twisted pair. |
| 3 | RS-232 Breakout Test Tool | 1 | Used to verify the presence of signals at RS-232 connections. |
| 4 | Screwdriver, Slotted 3/16-in. | 1 | Standard tool. |
| 5 | Screwdriver, Phillips #0 | 1 | Standard tool. |
| 6 | Screwdriver, Phillips #1 | 1 | Standard tool. |
| 7 | Screwdriver, Phillips #2 | 1 | Standard tool. |
| 8 | Hex Driver, M-4 | 1 | Standard tool. |
| 9 | Hex Driver, 3/16-in. or 5mm | 1 | Standard tool. |
| 10 | Hex Driver, 3/8-in. | 1 | Standard tool. |
| 11 | Wrench, 8-in., adjustable | 1 | Standard tool. |
| 12 | Needle-nose Pliers | 1 | Standard tool. |
| 13 | Flashlight | 1 | Standard item. |

Table 1-3. Leading Particulars

| DESCRIPTION | | CHARACTERISTICS |
|-------------------------------|-------------|-------------------------------------|
| PHYSICAL CHARACTERISTICS | | |
| Weight | | 1410 lbs |
| POWER REQUIREMENTS* | | |
| Voltage | | 120-240 Vac, 50-60 Hz |
| Current | | 82.10 A |
| Power | | 8.13 kW |
| ENVIRONMENTAL CHARACTERISTICS | | |
| Temperature | (Operating) | 50° to 86° F |
| | (Storage) | 0° to 110° F |
| Relative Humidity | (Operating) | 15 to 85% relative (non-condensing) |
| | (Storage) | 20 to 80% relative |
| Altitude | (Operating) | 0 - 8,000 ft |
| | (Storage) | 0 - 12,000 ft |

^{*}Estimate based on manufacturer-furnished data and engineering estimates for components of the system. Current and power estimates assume that all equipment is operating at surge.

Table 1-4. Capabilities and Limitations

| DESCRIPTION | CHARACTERISTICS |
|-------------------|---|
| Training Capacity | Provides 6 analyst training workstations to be used concurrently. |
| | SmartClass 2000 provides instructor with the capability of monitoring student actions and performance. |
| Data Storage | The DLT 7000 tape drive provides for on-line data storage capability. Seismic and hydroacoustic data is stored, as well as operating system data. |
| Data Processing | Allows students to pull seismic or hydroacoustic data from the server and perform interactive analysis. |

Table 1-5. Related Publications

| PUBLICATION NUMBER | PUBLICATION NAME |
|---------------------|---|
| 2-NDC-1 | United States National Data Center (Operation, Principles of Operation, and Fault Verification) |
| 2P-UPS/1400-1 | APC Back-UPS Pro User's Manual (990-2012-C) |
| 2P-UPS/SMART-1 | APC Smart-UPS 2200 and 3000 User's Manual (990-7016-B, Rev 3) |
| 2SE-CISCO/HUB400-1 | QuickStart Guide, FastHub 400 10/100 Series Cabling and Start Up (78-5566-01) |
| 2SE-CISCO/HUB400-7 | FastHub 400 10/100 Series Installation and Configuration Guide |
| 2SE-SC/2000-1 | The SmartClass SC2000 NM System with SC2000 C Control Unit User Guide |
| 2SE-SC/2000-7 | SmartClass SC2000 System Installation Manual |
| 2WS-ORACLE8i-8 | Oracle 8i Backup and Recovery Guide (A76993-01) |
| 2SW-PRNTR/OC710-1 | Lexmark Optra C710 User's Guide (10E0201) |
| 2WS-SPARC/DLT7000-1 | Sun 35-70 GByte SPARCstorage DLT 7000 Manual (805-0648-10) |
| 2WS-SUN/CM/21-1 | 21-inch Premium Color Monitor Guide (875-1844-01) |
| 2WS-SUN/CM17/20-1 | 17-inch/20-inch Premium Color Monitor Guide (875-1889-01) |
| 2WS-SUN/KBD-1 | Sun Keyboard and Mouse Product Notes (805-7170-10) |
| 2WS-ULTRA/E450-1 | Sun Ultra Enterprise E450 Server Owner's Guide (805-0429) |
| 2WS-ULTRA5/10-2 | Sun Ultra 5/10 Service Manual (805-0423) |

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CHAPTER 2

INSTALLATION

2-1. INTRODUCTION.

- 2-2. Chapter 2 provides hardware power up procedures for the United States National Data Center (US NDC) Training System. The Training System is composed of standard commercial off-the-shelf (COTS) equipment and software, and specialized applications software. It is assumed all hardware and software has been connected and/or installed; therefore, only procedures for bringing the system to the login prompt in the proper sequence are provided. If the system or any components fail to boot properly, refer to Chapter 5 for troubleshooting procedures. For additional information on COTS equipment and software, refer to the applicable identifying technical instruction (ITI).
- 2-3. The US NDC Training System is considered a permanent installation and all systems and components are already properly connected. Therefore, instructions are not provided for tear-down, relocation and re-installation. The cabling diagrams are provided in Chapter 7.
- 2-4. Each station and server in the system is assigned a functional name as well as a corresponding descriptive machine name (e.g., Training System Server is a functional name and tsserver is the corresponding machine name). References to either name may be found throughout this manual. A cross-reference list of station and server functional names and their corresponding machine names is provided in appendix 1.

2-5. SYSTEM POWER ON PROCEDURES.

- 2-6. Prior to powering on the Training System equipment, verify circuit breakers and surge suppressors/power centers are on and peripherals are off.
 - a. Power ON all uninterruptible power supplies (UPS).

- - NOTE - -

The hub does not have a separate power switch and is connected to the UPS on the student3 workstation; whenever the student3 workstation UPS is powered on, the hub is also powered on.

- •The Robotel junction boxes do not have separate power switches and are connected to the UPS on the Instructor Workstation. The Robotel hardware, except for the control box, is powered on whenever the Instructor Workstation UPS is powered on.
- b. Power ON the Training System Server (tsserver) monitor.
- c. Power ON the external tape drive.
- d. Power ON the Training System Server (tsserver) by turning on the switch on back of the central processing unit (CPU).
- e. Open the CPU front top door and turn the key to the off position (\bigcirc) and then return it to the on position (\mid).

-- NOTE --

The following step could take approximately five minutes to complete.

f. Verify the login screen appears on the monitor before proceeding to the next step.

- - NOTE - -

The following steps (steps g. through k.) are NOT order-specific, but cannot be performed until the Training System Server (tsserver) has finished booting.

- g. Power ON the Instructor and Student Workstation monitors.
- h. Power ON the Instructor and Student Workstation CPUs.
- i. Power ON the Robotel SmartClass 2000 control box.

- (1) The control box will prompt for a password.
- (2) Press return.
- j. Power ON the printer surge suppressor/power center.
- k. Power ON the printer.

2-7. SYSTEM STARTUP PROCEDURES.

- 2-8. Once the Training System Server (tsserver) is powered on, Oracle and Tuxedo should start automatically.
 - a. Login as trainer.
 - b. Right-click mouse and select **Launch** from menu.
 - c. Right-click mouse and select **Tuxpad** from menu.
 - d. Right-click mouse and select **Workflow** from menu.

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CHAPTER 3

OPERATION

3-1. INTRODUCTION.

3-2. Chapter 3 contains only operating procedures unique to the United States National Data Center (US NDC) Training System. For operating instructions common to both the US NDC and the Training System, refer to TI 2-NDC-1.

3-3. INDIVIDUAL WORKSTATION SHUTDOWN.

- 3-4. The Instructor and Student Workstations (instructor and student1 student6) and the Training System Server (tsserver) can be shut down individually using the following procedures. For full Training System shutdown, refer to paragraph 3-7.
- 3-5. INSTRUCTOR AND STUDENT WORKSTATION SHUTDOWN.

--NOTE --

The Standby switch will shut down the operating system and turn power to the workstation off. This is a safe manner of shutting down any of the workstations. The workstations will each take approximately one minute to shut down.

- a. At login prompt shut down the Instructor and Student Workstations (instructor and student1 student6) by pressing the recessed Standby switch on the front of the workstation to be shut down.
 - b. Power OFF the workstation monitor.
 - c. Turn OFF power switch on back of CPU.
- d. When shutting down the Instructor Workstation (instructor), power OFF the Robotel SmartClass 2000 control box using power switch on back of unit.
- e. If necessary or if required for maintenance, turn OFF uninterruptible power supply (UPS).
- 3-6. TRAINING SYSTEM SERVER SHUTDOWN.
- a. To shut down the Training System Server (tsserver), login to the server as root or trainer.

b. At the command prompt in a terminal window, type:

haltsys. □

YOU HAVE REQUESTED TO SHUTDOWN tsserver

Are you sure you want to continue? <yes / no>

c. At the <yes / no> prompt, type:

yes↓

-- NOTE --

The server will take approximately two minutes to shut down.

- d. Wait for the server to shut down. The fans will stop and lights on the front of the server will darken.
 - e. Turn OFF power switch on back of server.
 - f. Power OFF the external tape drive.
 - g. If necessary or if required for maintenance, turn OFF UPS.

3-7. SYSTEM SHUTDOWN.

- 3-8. To shut down the entire Training System, shut down the server, the workstations and all system peripherals using the following procedure:
 - a. Shut down each Student Workstation IAW paragraph 3-5.
 - b. Shut down Instructor Workstation (instructor) IAW paragraph 3-5.

-- NOTE --

Ensure Instructor and all student workstations are fully powered down before proceeding to next step.

- c. Shut down Training System Server (tsserver) IAW paragraph 3-6.
- d. Power OFF the printer.
- e. Power OFF the printer surge suppressor/power center.

-- NOTE --

When student3 workstation UPS is powered off, the hub also is powered off automatically.

f. Power OFF each UPS.

3-9. LOADING DATA ON THE TRAINING SYSTEM FROM TAPES.

- 3-10. Data is received from the US NDC on data tapes which must be loaded onto the Training System before use.
- a. Place data tape into the external tape drive on the Training System Server (tsserver).
- b. From any workstation, login as trainer and bring up the Training Launch window (see figure 3-1) by placing the cursor outside of all windows on the background and right-clicking the mouse.
 - Select Launch from the Root Menu.
- d. Bring up the Training WorkFlow window (see figure 3-2) on the second monitor by placing the cursor outside of all windows on the background of the second monitor and right-clicking the mouse.
 - e. Select **WorkFlow** from the Root Menu.
 - f. In the Training Launch window, right-click on **Training Import** button.
 - g. Select **Start**.
 - h. The **Training Import** button should turn green (Running).
- i. Monitor the Training Launch log window. The data will be read from the tape and loaded on the Training System Server (tsserver).

--NOTE --

This following step could take some time depending on the amount of data on the tape.

j. When completed, the following output will appear:

Verifying data read from tape. Import Completed.

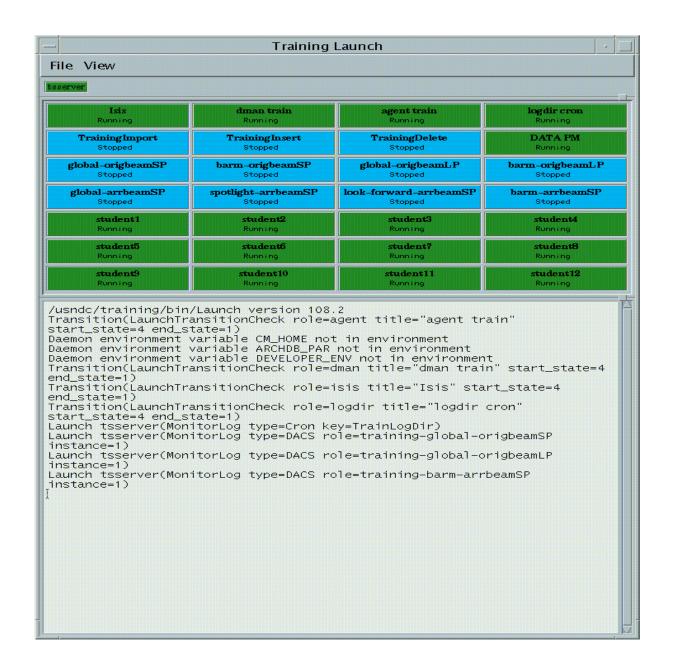


Figure 3-1. Training Launch Window

- k. In the Training WorkFlow window, locate the interval using the scroll bar along the bottom, then right-click on the light blue interval. If the interval is dark blue, the data is already loaded in database; skip to step o.
- I. A menu appears showing the interval is **on-disk**. From the menu, select **Insert Alphanumerics into DB**.

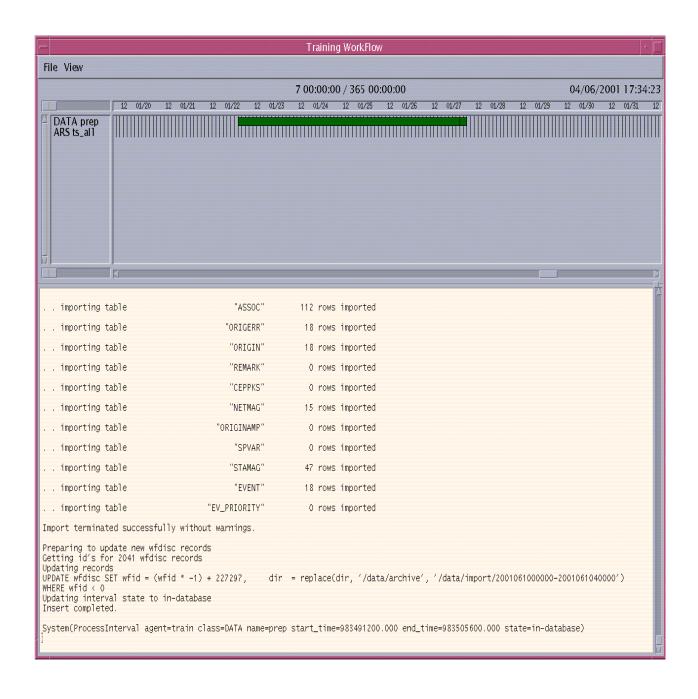


Figure 3-2. Training WorkFlow Window

- m. Monitor the Training WorkFlow window and verify it indicates the data is being inserted into tables.
- n. When completed, the interval in the Training WorkFlow window turns dark blue.

- o. Right-click on the dark blue interval.
- p. A menu appears showing the interval is **in-database**. From the menu, select **Generate Beams**.
- q. When all processes are running, the interval turns green in the Training WorkFlow window and the data is ready to be used by the students.

3-11. CREATING AND ADDING STUDENT ACCOUNTS.

--NOTE --

Only a trainer can create student accounts.

- a. On the Instructor Workstation (instructor), login as trainer.
- b. Bring up the Training Launch window (see figure 3-1) by placing the cursor on the desktop and right-clicking the mouse.
 - c. Select **Launch** from the Root Menu.

--NOTE --

A Training Launch window appears with buttons for student1 through student12. Green (Running) buttons indicate the account for that student has already been created. Red (Stopped) buttons indicate the account for that student has not yet been created. See figure 3-3.

- d. Right-click on the student account button for the account to be created. A menu appears with three options: **Create**, **Delete**, **Monitor**.
 - e. Select Create.

--NOTE --

The information appearing in the Training Launch log window also is written to a log file located in the /data/log/pipeline/Training directory.

f. Monitor the Training Launch log window. The window will display messages indicating the user, tables, indices, synonyms, and the five accounts (i.e., AL1, FAL, HAL, RAL, and RAL2) are being created.

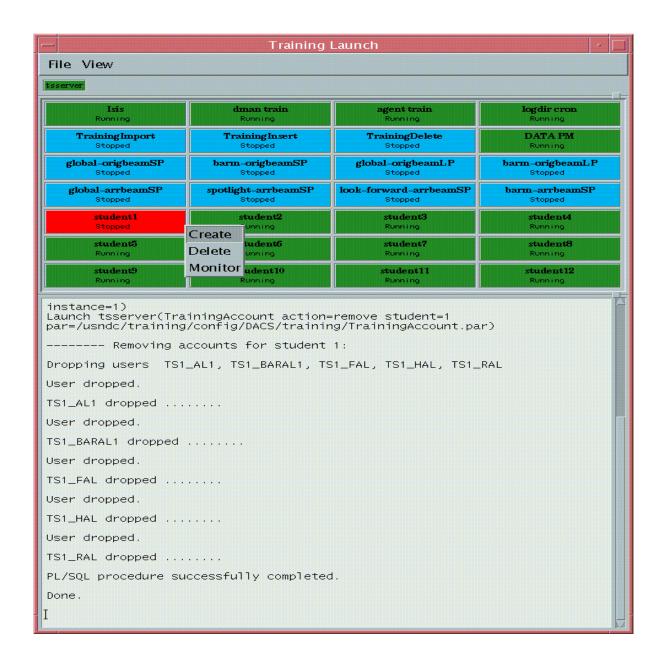


Figure 3-3. Launch Window Create/Delete Submenu

g. When completed, the following output will appear:

PL/SQL procedure successfully completed. Done.

h. The student account button for the account created will change to green (Running) indicating successful creation of that account.

i. Repeat steps d. through h. for each account to be created.

3-12. REMOVING A STUDENT ACCOUNT.

-- NOTE --

Only a trainer can remove student accounts.

- a. On the Instructor Workstation (instructor), login as trainer.
- b. Bring up the Training Launch window by placing the cursor outside of all windows on the background and right-clicking the mouse.
 - c. Select **Launch** from the Root Menu.

-- NOTE --

A Training Launch window appears with buttons for student1 through student12. Green (Running) buttons indicate the account for that student has already been created. Red (Stopped) buttons indicate the account for that student has not yet been created. See figure 3-3.

- d. Right-click on the student account button for the account to be deleted. A menu appears with three options: **Create**, **Delete**, **Monitor**.
 - e. Select Delete.

--NOTE --

The information appearing in the Training Launch log window also is written to a log file located in the /data/log/pipeline/Training directory.

- f. Monitor the Training Launch log window. The window will display messages indicating the five accounts (i.e., AL1, FAL, HAL, RAL, and RAL2) have been dropped.
 - g. When completed, the following output will appear:

PL/SQL procedure successfully completed. Done.

- h. The student account button for the account deleted will change to red (Stopped) indicating successful deletion of that account.
 - i. Repeat steps d. through h. for each account to be deleted.

3-13. SMARTCLASS 2000 PROCEDURES.

3-14. The instructor can perform various procedures using the SmartClass 2000 control box (e.g., viewing an individual student workstation to monitor the student's activity, blacking out student workstations in order to ensure students are not working on the workstation when a lesson requires otherwise). For these and other SmartClass 2000 operating procedures, refer to ITI 2SE-SC/2000-1.

3-15. DATABASE BACKUP, RESTORATION AND RECOVERY.

3-16. Database backups should be performed on a regular basis. For instructions on database backup, restoration, and recovery, refer to ITI 2WS-ORACLE8i-8.

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CHAPTER 4

PRINCIPLES OF OPERATION

4-1. INTRODUCTION.

- 4-2. Chapter 4 provides a system overview and functional description of the United States National Data Center (US NDC) Training System. A thorough understanding of the function of the hardware components, software, and data flow between system components is critical to performing system administration and maintenance on the Training System equipment. This chapter is divided into three sections as follows:
 - a. Section I presents a system overview.
 - b. Section II provides a functional description of the hardware.
 - c. Section III provides descriptions of the data flow and processes.

SECTION I

SYSTEM OVERVIEW

4-3. GENERAL.

- 4-4. The US NDC Training System provides analyst training to Air Force Technical Applications Center (AFTAC) personnel using the US NDC operational system. The Training System is located at Goodfellow AFB. All of the US NDC interactive analysis software functions are available on the Training System for use as needed in the training program. These functions include beamforming, analysis, and bulletin preparation.
- 4-5. Training datasets are set up for the training courses by the instructor using data obtained from the US NDC Archive Subsystem. This data consists of all automated processing results (alphanumerics) produced by the US NDC operational system and unprocessed seismic and hydroacoustic waveform data contained on the US NDC Archive Subsystem for the timeframe identified by the instructor. Figure 4-1 shows the flow of the data through the US NDC Training System.

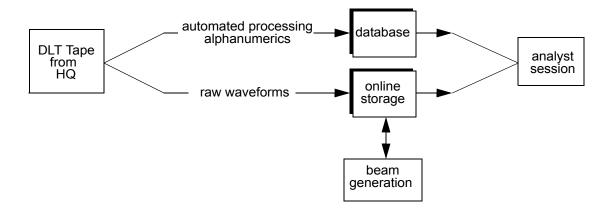


Figure 4-1. US NDC Training System Data Flow

4-6. DATABASE ACCOUNTS.

4-7. The Oracle database on the Training System contains a set of automated processing accounts configured like those found on the US NDC operational system. The database also contains interactive processing accounts for students which cover the first stage of analysis in each pipeline found on the US NDC operational system. This will provide each student a set of accounts, each named to correspond with the name of a US NDC operational system pipeline. The instructor will maintain all accounts, including inserting and deleting data from accounts, and removing and creating the student accounts.

4-8. STUDENT WORKSTATIONS.

4-9. The Student Workstations provide the interactive analysis environment needed for training on the US NDC analysis functions. This environment matches the analysis environment used on the US NDC operational system. Beyond this the Student Workstations (student1 - student6) are connected to the Instructor Workstation (instructor) with the SmartClass 2000 Computer Classroom Control System, a commercial off-the-shelf (COTS) software training package that provides training functions such as the capability to display instructor workstation activities on student workstations and student workstation activities on the Instructor Workstation (instructor).

4-10. INSTRUCTOR WORKSTATION.

4-11. The Instructor Workstation (instructor) contains functionality beyond that of the Student Workstations. From this workstation, the instructor has access to all analysis and maintenance activities. These activities include student account management, process control, and data preparation. A configuration of the Launch and WorkFlow applications

provides the user interfaces needed for these activities. The Instructor Workstation work area also contains the control panel for a training tool that allows selected displays on the Instructor Workstation to be displayed on Student Workstations, and selected displays on Student Workstations to be displayed on the Instructor Workstation.

4-12. LOADING DATA SETS.

4-13. Waveform and alphanumeric data from the US NDC Classified System is loaded on the Training System using digital linear tape (DLT) media and the UNIX tar command. The waveform data is copied to tape in CSS 3.0 format, while the alphanumeric data from all of the automated processing accounts is copied to tape in Oracle export format. With the exception of wfdisc records, alphanumeric data loaded onto the Training System is not modified in any manner. The wfdisc records, however, are modified to account for differences in the locations of waveform files on the US NDC Operational System and the Training System, and to account for wfdisc identifier rollover, which occurs each time that the operational system reaches 100 million wfdisc records.

4-14. BEAM GENERATION.

4-15. The US NDC operational system, through the use of automated processing, generates arrival and origin beams automatically. Since raw data can be received on the US NDC operational system after analysis is performed on the available data, there is a potential for beams to be missing from the imported datasets. The Training System must provide the capability to generate arrival and origin beams from the available raw data. This is a manually initiated process on the Training System and is performed from the Instructor Workstation WorkFlow interface.

4-16. STUDENT DATABASE ACCOUNT PREPARATION.

4-17. Student database accounts are prepared for training by removing the analysis results left over from the last training course conducted on the Training System. This is accomplished by simply removing and then recreating the student account itself, which deletes all analysis results it contains in the process. This functionality is provided from the Launch interface on the Instructor Workstation.

4-18. STORAGE CAPACITY.

4-19. The Training System provides storage capacity for fifteen days of waveform and alphanumeric data generated by the US NDC, and the storage capacity to store the alphanumeric data generated by students and the instructor during training. An estimated 17 GB per day of waveform data will be received and stored on the US NDC. An additional 0.074 GB of alphanumeric data per day will be generated by the US NDC pipeline processes. The students will generate an estimated 2 GB of alphanumeric data during training class. This implies that the Training System must have the storage capacity for (((17 + 0.074) * 15) + 2) = 258 GB data. The Training System contains a 280 GB file system for this data.

4-20. BACKUP CAPABILITY.

4-21. An automated backup capability is provided to minimize the possibility of data loss. Solstice data (also called Networker) is configured to run scheduled full and incremental backups of selected files and directories. Some files and directories are not automatically backed up because the data is already available on tape (e.g., the Knowledge Base). Hot backups of Oracle database files are performed via Oracle cron jobs and these backup files are backed up to tape as part of the scheduled Networker backups, along with other pertinent files and directories.

SECTION II

FUNCTIONAL DESCRIPTION

4-22. TRAINING SYSTEM HARDWARE.

- 4-23. The Training System consists of a server, an instructor workstation, and six student workstations connected via a hub. The server hosts the application software, the seismic and hydroacoustic data, and the database.
- 4-24. The Training System hardware (figure 4-2) duplicates the analysis capabilities which exist on the Phase 1 US NDC operational system.

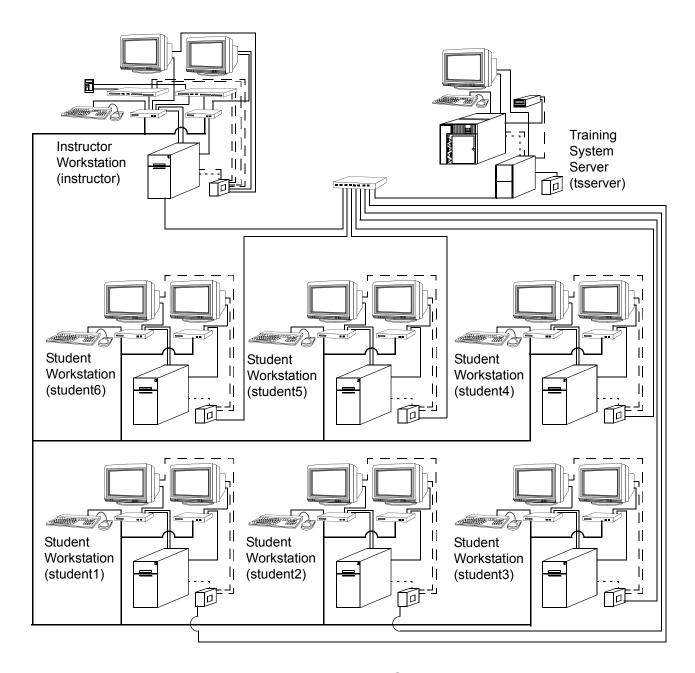


Figure 4-2. Training System

4-25. STUDENT WORKSTATIONS.

4-26. The Student Workstations provide students with the software interfaces and processes to support training on US NDC analyst functions. Beyond this, the Student Workstations are connected to the Instructor Workstation with the SmartClass 2000 Computer Classroom Control System, a COTS software training package which provides training functions such as the capability to display the Instructor Workstation activities on Student Workstations and Student Workstation activities on the Instructor Workstation.

4-27. INSTRUCTOR WORKSTATION.

4-28. The Instructor Workstation provides the instructor access to all analysis, maintenance, and computer assisted training functions. Maintenance functions include managing student accounts and processes, preparing analysis data, and setting up database accounts for students. The instructor workstation work area contains the control panel for the SmartClass 2000 Control System for access during training. This computer assisted training tool allows selected displays on the Instructor Workstation to be displayed on Student Workstations, and selected displays on the Student Workstations to be displayed on the Instructor Workstation.

4-29. TRAINING SYSTEM SERVER.

4-30. The Training System Server (tsserver) hosts the US NDC Oracle database tables and user accounts for the students and the instructor. It also contains the necessary storage capacity for waveforms and alphanumeric data imported from the US NDC Operational System and alphanumeric data generated by students during training. A DLT tape drive is also connected to the database server. The DLT tape drive is necessary to load alphanumeric and waveform data from the US NDC Operational System, and to perform routine Training System backups.

4-31. TRAINING SYSTEM PRINTER.

4-32. The Training System printer produces high quality hard copy and graphics in both black and white and in color.

4-33. SMARTCLASS 2000 EQUIPMENT.

4-34. The Training System includes SmartClass 2000 equipment which allows the instructor to control projecting the displays from both instructor workstation monitors to any or all of the student workstation monitors. It also allows the instructor to view the display on any student workstation monitors from the instructor workstation monitors.

4-35. HUB.

4-36. The Training System includes a 12-port Cisco FastHub 400 10/100series hub for network connectivity between the workstations, server and printer. The Training System is installed as a stand-alone system with no external network connectivity.

4-37. UNINTERRUPTIBLE POWER SUPPLIES.

4-38. All of the Training System hardware, except the printer, is configured to run from uninterruptible power supplies (UPS). The server, DLT 7000 tape drive, and server monitor are connected via an APC 3KVA UPS. The Instructor Workstation and SmartClass 2000 hardware are connected to a 2.2KVA UPS. Each of the Student Workstations is connected

to an APC 1.4KVA UPS. In addition, the Cisco network hub is connected to the UPS used for Student Workstation 3. The printer is connected to power through a surge suppression power strip.

SECTION III

PROCESSES AND DATA FLOW

4-39. **GENERAL**.

- 4-40. A data tape provided to the Training System contains datasets chosen by the instructor or by staff at the headquarters for use in training. The TrainingExport utility is run on the US NDC Classified Archive Subsystem against the desired list of datasets provided, to produce the tape. TrainingExport places all available waveform data and alphanumerics from all automated processing accounts for each dataset onto the tape, as well as checksum values to be used on the Training System to verify the integrity of the data extracted from tape.
- 4-41. The operation of the Training System to prepare datasets for training involves the use of the Launch and WorkFlow interfaces on the Instructor Workstation to perform the following functions:
 - a. Export data to tape.
 - b. Import data from tape.
 - c. Insert alphanumerics into the database.
 - d. Generate beams for datasets.
- 4-42. Figure 4-3 shows the data flow for the transfer of data from the US NDC Archive Subsystem to the US NDC Training System.
- 4-43. EXPORTING DATA TO TAPE.
- 4-44. Instructions for exporting data from the US NDC to tape are provided in TI 2-NDC-1.
- 4-45. IMPORTING DATA FROM TAPE.
- 4-46. On receipt of the tape of data extracted from the US NDC Archive, the utility TrainingImport is run from the US NDC Training System Instructor Workstation to place the data into a file system and to add intervals to the WorkFlow interface for each data set. The instructor loads each data set into the database individually by selecting the load function from the popup menu of the appropriate WorkFlow interval. Once the load has completed, the detection and origin beams for each data set are then created by selecting the generate beams function from the popup menu of the appropriate WorkFlow interval.

4-47. INSERTING ALPHANUMERICS INTO DATABASE.

4-48. Datasets imported into the Training System from tape are initially only in online storage. The alphanumerics associated with the datasets are not yet in the database. The datasets can be inserted individually into the database as needed for training. The instructor inserts a dataset into the database by selecting the insert function from the popup menu of the appropriate WorkFlow interval.

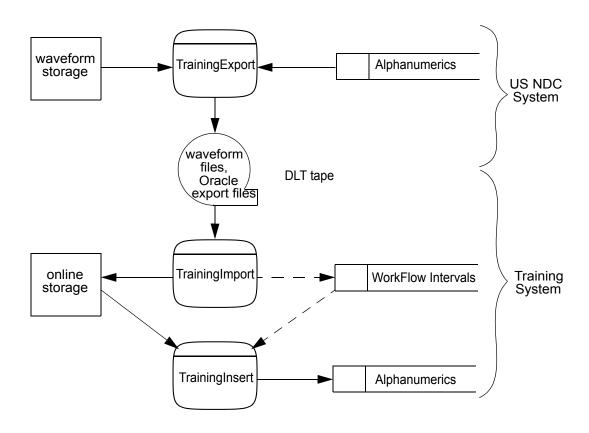


Figure 4-3. US NDC to Training System Data Flow

4-49. The insert process will modify the wfdisc records to account for differences in the locations of waveform files on the US NDC Archive Subsystem and the Training System, and to account for wfid rollover which occurs each time the operational system reaches 100 million wfdisc records. No other alphanumerics are modified. This creates all of the beams that the US NDC operational system creates for each of the processing pipelines.

- 4-50. GENERATING BEAMS FROM DATASETS.
- 4-51. Once the alphanumerics have been inserted into the database, the arrival and origin beams for each dataset are created by selecting the generate beams function from the popup menu of the appropriate WorkFlow interval.

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CHAPTER 5

MAINTENANCE

5-1. INTRODUCTION.

5-2. Chapter 5 contains information for troubleshooting and maintaining the software and hardware of the United States National Data Center (US NDC) Training System. Section I contains information on routine maintenance, including troubleshooting, removal and replacement procedures, and software/hardware maintenance routines. Section II contains information on preventive maintenance.

SECTION I

ROUTINE MAINTENANCE

5-3. GENERAL.

- 5-4. This section discusses the routine maintenance vital to proper operation of the US NDC Training System. Maintenance of the Training System equipment is the responsibility of the instructor/maintainer. The maintainer is expected to define, verify, and record system problems when encountered. If the maintainer encounters problems not resolvable at the Training System location, contact systems control personnel at US NDC headquarters location.
- 5-5. At the organizational level, the maintainer performs tasks outlined in this technical instruction (TI). When a failure is reported by a student, or is discovered by the maintainer, the maintainer isolates the problem to the line replaceable unit (LRU). If the failed item is covered under a maintenance service contract, the commercial contractor is notified and either repairs or replaces the item, or the item is removed and returned to the appropriate maintenance service contractor for repair or replacement. Failed items not under a service contract are removed and replaced by the maintainer in accordance with (IAW) procedures outlined in this section or described in referenced service manuals.
- 5-6. Depot level maintenance consists of repair of faulty LRUs and is performed by the original equipment manufacturers. Software maintenance is performed by the developmental contractor.

5-7. TEST EQUIPMENT.

5-8. Test equipment and special tools required to perform the troubleshooting and repair procedures described in this section are listed in table 1-2.

5-9. TROUBLESHOOTING PROCEDURES.

CAUTION

Electrostatic Discharge Sensitive (ESDS) devices must be handled with certain precautions, which must be followed to minimize the effect of static build-up. Refer to MIL-STD-1686C and Technical Order (TO) 00-25-234. ESDS devices are identified in this TI by the following symbol:



- - NOTE - -

The maintainer should be thoroughly familiar with chapters 2, 3 and 4 of this manual prior to troubleshooting.

- •The maintainer should be familiar with TI 2-NDC-1 and should be familiar with the operation of the graphical user interface (GUI) tools Launch and WorkFlow.
- •During the troubleshooting process, all configuration changes and removal and replacement activities should be documented for traceability purposes.
- 5-10. When troubleshooting the US NDC Training System problems, see figure 5-1. The following paragraphs, in conjunction with figure 5-1, describes the overall troubleshooting approach.
- 5-11. The maintainer must determine if the problem/symptom is obviously with the hardware. If not immediately identifiable, use paragraph 5-15 for general troubleshooting checks in conjunction with chapter 4, chapter 7, or other appropriate sources to help identify the problem. Such sources should be used in conjunction with troubleshooting techniques even after the problem is identified.
- 5-12. SYSTEM. If the problem is not obviously hardware, refer to table 5-1. Table 5-1 lists the most likely problems and symptoms in column one which can occur in the US NDC Training System.

- 5-13. The second column in table 5-1 lists possible sources of the problem/symptom. The third column in table 5-1 provides a troubleshooting reference for the corresponding problem and source. For a given problem/symptom, the troubleshooting references listed in the third column should be used in the order which they appear.
- 5-14. HARDWARE. Perform paragraph 5-22 as an initial troubleshooting procedure for all hardware components. If the problem is with the equipment, the maintainer should refer to table 5-2 for the troubleshooting references. Table 5-2 will assist the maintainer in troubleshooting to the LRU level. The first column in table 5-2 lists possible hardware problems/symptoms. The second column lists possible sources of the problem or symptom. The third column provides references to troubleshooting procedures in this manual or to commercial off-the-shelf (COTS) manuals identified by an identifying technical instruction (ITI) number. The fourth column refers to the paragraph in this manual or the appropriate COTS manual for removal and replacement procedures.

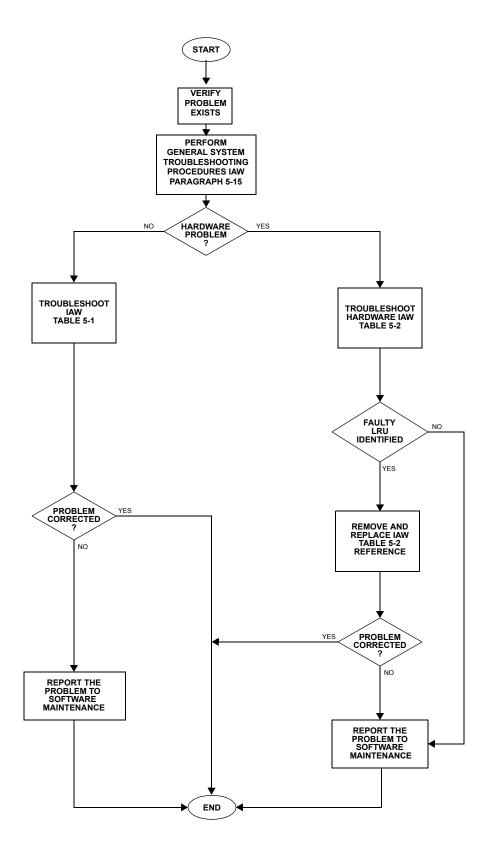


Figure 5-1. General Troubleshooting Flowchart

Table 5-1. General Troubleshooting

| PROBLEM/SYMPTOM | POSSIBLE SOURCE OF PROBLEM | TROUBLESHOOTING REFERENCE |
|--|---|------------------------------|
| tsserver shows red in Training Launch window. | Sockd process is not running. | Perform paragraph 5-27. |
| | Machine is not running. | Perform paragraph 5-28. |
| | Machine is locked up or is inaccessible. | Perform paragraph 5-28. |
| | All client machines are locked up or are inaccessible. | Perform paragraph 5-28. |
| | All machines are locked up or are inaccessible. | Perform paragraph 5-55. |
| Process (located in the left | Process is not running. | Perform paragraph 5-30. |
| column) shows red (stopped) in Training Launch window or cannot be started. | Process failed due to missing log directory. | Perform paragraph 5-32. |
| Student <id> shows red (stopped) in Training Launch window.</id> | Database accounts for student are missing. | Perform paragraph 5-34. |
| Interval shows red (import-failed) in Training WorkFlow window. | TrainingImport failed due to bad tape. | Perform paragraph 5-36. |
| Interval shows red (insert-failed, delete-failed) in Training WorkFlow window. | Process failed due to missing import files. | Perform paragraph 5-38. |
| Interval shows red (failed) in Training WorkFlow window. | Process failed due to missing log directory. | Perform paragraph 5-32. |
| An interval has been in an active processing state (<pre>(<pre>process>-start) for too long in Training WorkFlow window and/or the associated process MonitorLog window shows no activity.</pre></pre> | An isolated inter-process communications error occurred. | Perform paragraph 5-40. |
| | The sequencer process is hung. | |
| | Dman is hung or all inter-process communications are failing. | Perform paragraph 5-42. |

Table 5-1. General Troubleshooting (Cont)

| PROBLEM/SYMPTOM | POSSIBLE SOURCE OF PROBLEM | TROUBLESHOOTING REFERENCE |
|--|--|---------------------------|
| ARS has had a busy cursor for too long. | ARS is hung with a bad command sequence. | Perform paragraph 5-44. |
| Database files are missing or corrupted. | Media failure. | Perform paragraph 5-46. |

Table 5-2. Hardware Troubleshooting

| PROBLEM | POSSIBLE SOURCE OF PROBLEM | TROUBLESHOOTING REFERENCE | REMOVAL AND REPLACEMENT REFERENCE |
|---------------------------------|----------------------------------|---|---|
| AC Power Indicators | Power Cord | Perform paragraph 5-25. | Perform paragraph 5-48. |
| | Uninterruptible Power Supply | Perform paragraph 5-26. | Perform paragraph 5-49. |
| Display | Monitor (17") | Refer to ITI 2WS-SUN/CM/17/20-1. | Refer to associated processor manual. |
| | Monitor (21") | Refer to ITI 2WS-SUN/CM/21-1. | Refer to associated processor manual. |
| | Video Card | Refer to associated processor manual. | Refer to associated processor manual. |
| | Monitor Cable | Refer to ITI 2WS-SUN/CM/17/20-1 or ITI 2WS-SUN/CM/21-1. | Refer to associated processor manual. |
| Keyboard | Keyboard | Refer to ITI 2WS-SUN/KBD-1. | Refer to ITI 2WS-SUN/KBD-1. |
| Lexmark C710 Printer | Printer | Refer to ITI 2SW-PRNTR/OC710-1. | Perform paragraph 5-50. |
| Mouse | Mouse | Refer to ITI Refer to ITI 2WS-SUN/KB5-11. | Refer to ITI 2WS-SUN/KB5-11. |
| SmartClass 2000 Equipment | SC2000 Control Unit | Refer to ITI 2SE-SC/2000-1. | Perform paragraph 5-51. |
| | SC2000 Junction Box | Refer to ITI 2SE-SC/2000-1. | Perform paragraph 5-52. |
| | SC2000 Interface Box | Refer to ITI 2SE-SC/2000-1. | Perform paragraph 5-53. |
| Ultra 10 Workstation | Internal components | Refer to ITI 2WS-ULTRA5/10-2. | Perform paragraph 5-54. |

Table 5-2. Hardware Troubleshooting (Cont)

| PROBLEM | POSSIBLE SOURCE OF PROBLEM | TROUBLESHOOTING REFERENCE | REMOVAL AND REPLACEMENT REFERENCE |
|--------------------------------|----------------------------------|--|---|
| Ultra Enterprise 450 Server | Internal components | Refer to ITI 2WS-ULTRA/ E450-1. | Perform paragraph 5-55. |
| | External Tape Drive | Refer to ITI 2WS-SPARC/ DLT-7000-1. | Perform paragraph 5-55. |
| Cisco FastHub 400 | Hub | Refer to ITI 2SE-CISCO/HUB400-7. | Perform paragraph 5-56. |

5-15. GENERAL SYSTEM TROUBLESHOOTING.

- 5-16. The following procedures should be used for initially troubleshooting problems or symptoms.
- a. Check process status indicators for abnormal conditions. Refer to controls and indicators in TI 2-NDC-1, chapter 3.
 - b. Check application-level log files for affected processes IAW paragraph 5-17.
 - c. Check application-level process lists IAW paragraph 5-18.
 - d. Check swap space utilization IAW paragraph 5-19.
 - e. Check disk partition usage IAW paragraph 5-20.
 - f. Check system-level log files IAW paragraph 5-21.
 - g. Check system-level process lists IAW paragraph 5-18.

5-17. REVIEW APPLICATION LEVEL LOG FILES.

- a. If application log file can be viewed from Training Launch window, perform the following steps. If not, skip to step 5-17. b.
- (1) Place cursor over process indicator in Training Launch window and right-click mouse.
 - (2) Select **Monitor** from drop-down menu.
 - (3) Review application log file for errors.

- (4) Take appropriate action as defined by error message or notify software maintenance.
 - b. If application log file cannot be viewed from Training Launch window:
 - (1) Refer to appendix 3 of TI 2-NDC-2 for log file location.
 - (2) Review application log file for errors by typing:
- (3) Take appropriate action as defined by error message, or notify software maintenance.
- 5-18. PROCESS MAINTENANCE.
 - a. To list processes, in an terminal window, type:
- ps -ef | grep <account name>. (Where <account name> = account which started the process; e.g., trainer, student1, root)
- b. Look for process or processes using excessive memory or central processing unit (CPU) time.
- c. If there are any redundant processes or any processes using excessive memory or CPU time, kill and restart the process.
 - d. If process cannot be killed from GUI, kill process by typing:
- kill -9 <pid>→ (Where <pid>= unique process identification number)
- 5-19. SWAP SPACE UTILIZATION.

-- NOTE --

Perform the following procedure on the server, then on individual workstation, if necessary.

a. To check swap space, type:

/opt/local/bin/top↓

b. If swap space usage is 85% or higher at the end of the CPU states: line, exit session by typing <Ctrl>c and log back in.

5-20. DISK PARTITION CHECK.

-- NOTE --

Perform the following procedure on the server, then on individual workstation, if necessary.

a. Check disk partition usage by typing:

df -kl↓

b. If any partition is full, notify software maintenance.

5-21. SYSTEM LEVEL LOG FILES.

a. Review system-level log files by typing:

more /var/adm/messages↓

b. Review system-level log files by typing:

more /var/log/syslog↓

c. For error messages, take appropriate action IAW applicable ITI.

5-22. TROUBLESHOOTING PROCEDURES.

- 5-23. GENERAL HARDWARE TROUBLESHOOTING PROCEDURES.
- 5-24. The following procedure should be used as an initial troubleshooting procedure for all hardware components.
- a. Visually inspect the equipment. Refer to appropriate equipment ITI as required.
 - (1) Check power.
 - (2) Check cables and connectors.
 - (3) Check switch settings.
 - (4) Check indicators.
 - b. Check for on-going or recent maintenance actions.
 - c. Verify Local Area Network (LAN) connectivity.

d. Refer to table 5-2 for hardware troubleshooting references.

5-25. POWER CORD TROUBLESHOOTING PROCEDURE.

- a. Verify assembly power switch is turned on.
- b. If connected to a power center, verify power center is turned on.
- c. Visually inspect power cord for physical damage.
- d. If necessary, remove and replace IAW table 5-2.

5-26. UNINTERRUPTIBLE POWER SUPPLY TROUBLESHOOTING PROCEDURE.

- a. Verify source circuit breaker to uninterruptible power supply (UPS) is on.
- b. Verify UPS power switch is turned on.
- c. Troubleshoot UPS IAW ITI 2P-UPS/1400-1 and 2P-UPS/SMART-1.

5-27. SOCKD PROCESS IS NOT RUNNING.

- a. In Training Launch window, right-click on **tsserver** button and select **Start Launchd**.
 - b. If **tsserver** button does not turn green, continue troubleshooting IAW table 5-1.
- c. If **tsserver** button turns green but problem persists, continue troubleshooting IAW table 5-1 or contact software maintenance.
- 5-28. MACHINE IS NOT RUNNING OR IS INACCESSIBLE.
- 5-29. To determine if a machine is not running or is inaccessible, proceed as follows:
- a. From a terminal window from another machine, ping suspect machine by typing:

ping <machine name>→ (Where <machine name> = name of suspect machine)

b. If result from ping is no answer from <machine name>, refer to paragraph 5-22 for continued troubleshooting.

c. If result from ping is <machine name> is alive, attempt to run a command on the suspect machine by typing:

rsh <machine name> uname $-n \ \ \Box$ (Where <machine name> = name of suspect machine)

- d. If response from uname command is <machine name>, the machine is running; contact software maintenance.
- e. If response from the uname command is NOT <machine name>, the machine failed.
- f. Perform individual workstation shutdown/power off procedures for suspect machine IAW paragraph 3-3.
 - g. Power ON suspect machine monitor.
 - h. Power ON suspect machine CPU.
- i. If machine is still not running or is still inaccessible, continue troubleshooting IAW table 5-1 or contact software maintenance.
- 5-30. PROCESS IS NOT RUNNING.
- 5-31. If a process (in top four rows) shows red in Launch window or cannot be started, proceed as follows:
- a. To restart process, right-click on stopped process indicator block and select **Start**.
 - b. If process starts, the corresponding process button turns green.
- c. If process does not start or stops again after being re-started, proceed to next possible source of problem in table 5-1.
- 5-32. PROCESS FAILED DUE TO MISSING LOG DIRECTORY.
- 5-33. To determine if a process failed due to a missing log directory, perform the following:
- a. List the contents of the pipeline log directory for the current Julian date by typing:
- ls /data/log/pipeline/<jdate>→ (Where <jdate> is current Julian date formatted YYYYDDD and YYYY = year and DDD = day of year)

- b. If there is error output, proceed to paragraph f.
- c. If there is no error output and the symptom is Process cannot be started from Launch, notify software maintenance; otherwise, list the contents of the log directory for the jdate of the data being processed by typing:
- ls /data/log/pipeline/<jdate>→ (Where <jdate> is Julian date of the data being processed formatted YYYYDDD and YYYY = year and DDD = day of year)
 - d. If there is error output, proceed to paragraph f.
 - e. If there is no error output, notify software maintenance.
 - f. Create log directories for the current jdate by typing:
- AddLogDirs type=Train jdate=<jdate>... (Where <jdate> is current Julian date formatted YYYYDDD and YYYY = year and DDD = day of year)

 AddLogDirs type=IA jdate=<jdate>... (Where <jdate> is current Julian date
- AddLogDirs type=IA jdate=<jdate>... (Where <jdate> is current Julian date formatted YYYYDDD and YYYY = year and DDD = day of year)
- g. List the contents of the pipeline log directory for the current Julian date by typing:
- ls /data/log/pipeline/<jdate>→ (Where <jdate> is current Julian date formatted YYYYDDD and YYYY = year and DDD = day of year)
 - h. If there is error output, contact software maintenance.
- i. If no error output, attempt to restart process by right-clicking on stopped process block and select **Start**.
 - j. If process starts, the corresponding process button turns green (Running).
- k. If process doesn't start or stops again after being restarted, contact software maintenance.
- 5-34. DATABASE ACCOUNTS FOR STUDENT ARE MISSING.
- 5-35. If a process labeled 'student<id>'shows red in Launch window, proceed as follows:
- a. To restart process, right-click on the stopped process indicator block and select **Create** and wait for the Launch text window to stop scrolling.

- b. If process starts, **student<id>** button will turn green.
- c. If the process does not start, select **Delete** and wait for the Launch text window to stop scrolling.
 - d. Select **Create** and wait for the Launch text window to stop scrolling.
 - e. If process starts, **student<id>** button will turn green.
 - f. If process does not start, notify software maintenance.
- 5-36. TRAININGIMPORT FAILED DUE TO BAD TAPE.
- 5-37. To determine if TrainingImport failed due to a bad tape, where the results of a data check run at AFTAC do not match the results of the data check run on the data extracted from tape on the Training System, perform the following:
 - a. Attempt to import the data once again.
- b. If this attempt fails, return the tape to software maintenance personnel to determine if the tape was damaged in transit and request another tape.
- 5-38. PROCESS FAILED DUE TO MISSING IMPORT FILES.
- 5-39. To determine if a process failed due to missing files originally placed on disk by the TrainingImport process, perform the following:
- a. Select **Monitor insert** or **Monitor delete** from the interval menu in WorkFlow to display the application log file corresponding to the failed function.
- b. If the log indicates Can't open checksum file in directory '<name>', then the specified directory has been improperly modified.
- (1) Load the tape containing the dataset corresponding to the directory into the tape drive.
- (2) Right-click on TrainingImport process indicator block in Launch and select **Start**.
- (3) After the data is imported from tape, attempt the **Monitor insert** or **Monitor delete** function again.
 - c. If error condition still exists, notify software maintenance.

- 5-40. AN ISOLATED INTER-PROCESS COMMUNICATIONS ERROR OCCURRED OR THE SEQUENCER PROCESS IS HUNG.
- 5-41. To determine if the pipeline missed a processing request message or a processing completed message for an interval causing the processing state of the interval to not change, perform the following:
- a. If the state of the process is queued, the processing request message to the sequencer process was probably lost. Select **Process** from the interval menu in the Pipeline WorkFlow to send a new request message to the sequencer.
- (1) If the interval is processed, the problem is solved and the following can be skipped.
- (2) If the interval will not process, refer to paragraph 5-41.c. to restart the sequencer.
- b. If the state of the process is not queued, select the **Monitor** items from the menu of the incompletely processed interval in the Pipeline WorkFlow in a sequence starting from the bottom of the menu. Search for the last process that ran for the interval (i.e. produced some amount of log output).
- (1) If the output of the last process that ran indicates that the process ran to completion several minutes ago, refer to paragraph 5-41.c. to restart the sequencer.
- (2) If the output does not indicate that the process completed, wait for the process to either complete or fail. If it fails, continue troubleshooting IAW table 5-1.
- c. Select **Stop** from the menu of the sequencer process in the Tuxpad window, then select **Process** from the menu of each hung interval associated with the sequencer in Pipeline WorkFlow. The sequencer process should soon restart automatically.
- 5-42. ALL INTER-PROCESS COMMUNICATIONS ARE FAILING.
- 5-43. The status of inter-process communications is reflected in the sequencer log, where a record is kept of each message sent between two pipeline processes (i.e., the message sent when a tis process awakens each 60 seconds). To determine if the inter-process communications have stopped, perform the following:
- a. Select **Monitor** from the menu of the sequencer process in the Tuxpad window.
- b. If the output shows regular status updates for any sequencer, there is no problem with inter-process communications.

- c. If the output shows no new lines for at least 60 seconds from all sequencers, there may be a problem with Tuxedo. Restart Tuxedo using the procedures defined in chapter 3 of TI 2-NDC-1. If this does not solve the problem, contact systems control personnel.
- 5-44. ARS IS HUNG WITH A BAD COMMAND SEQUENCE.
- 5-45. To determine if ARS can be taken out of the busy state, perform the following:
- a. Raise the ARS scheme window and enter the following command to force ARS to return control to the analyst:

(show-busy-cursor nil)

- b. Attempt to continue interacting normally with ARS.
 - (1) If ARS responds to requests, then the problem is solved.
- (2) If ARS does not respond, press **<Control>c** in the scheme window to terminate ARS, and launch ARS from the dman **Launch** menu.
 - (3) If ARS still does not respond, contact software maintenance.

5-46. MEDIA FAILURE.

- a. To restore database files, perform applicable restoration procedure located in ITI 2WS-ORACLE8i-8.
- b. To recover database files, perform applicable recovery procedure located in ITI 2WS-ORACLE8i-8.

5-47. REMOVAL AND REPLACEMENT PROCEDURES.

5-48. POWER CORD.

- a. Power OFF equipment switch connected to faulty power cord.
- b. Disconnect power cord from power center.
- c. Disconnect power cord from equipment.
- d. Connect new power cord to equipment, then to power center.
- e. Turn ON equipment power switch and return to normal operation IAW chapter 2.

5-49. UNINTERRUPTIBLE POWER SUPPLY.

- a. Power OFF equipment connected to UPS IAW procedures in chapter 3.
- b. Power OFF UPS.
- c. Label all cables and note location of connectors, then disconnect equipment connected to UPS.
- d. Remove faulty UPS IAW procedures in ITI 2P-UPS/SMART-1 for Training System Server UPS and Instructor Workstation UPS and ITI 2P-UPS/1400-1 for Student Workstation UPS.
 - e. Install replacement UPS and turn ON power switch.
 - f. Reconnect equipment to UPS.
- g. Return any equipment powered off to normal operation IAW procedure in chapter 2.

5-50. PRINTER.

- a. If necessary, power OFF the printer.
- b. Remove and replace faulty components IAW ITI 2SW-PRNTR/OC710-1.
- c. Power ON the printer and verify proper operation by running **PRINT MENUS** from the front panel **TESTS MENU** list.

5-51. SMARTCLASS 2000 CONTROL UNIT.

- a. Power OFF SmartClass 2000 control unit using switch on back of control unit.
- b. Label all cables and note location of connectors, then disconnect equipment connected to SmartClass 2000 control unit.
 - c. Remove faulty SmartClass 2000 control unit.
 - d. Install replacement SmartClass 2000 control unit.
 - e. Reconnect equipment connected to SmartClass 2000 control unit.
- f. Return any equipment powered off to normal operation IAW procedure in chapter 2.

5-52. SMARTCLASS 2000 JUNCTION BOX.

- a. Power OFF SmartClass 2000 control unit using switch on back of control unit.
- b. Label all cables and note location of connectors, then disconnect equipment connected to SmartClass 2000 junction box.
 - c. Remove faulty SmartClass 2000 junction box.
 - d. Install replacement SmartClass 2000 junction box.
 - e. Reconnect equipment connected to SmartClass 2000 junction box.
- f. Return any equipment powered off to normal operation IAW procedure in chapter 2.

5-53. SMARTCLASS 2000 INTERFACE BOX.

- a. Power OFF SmartClass 2000 control unit using switch on back of control unit.
- b. Label all cables and note location of connectors, then disconnect equipment connected to SmartClass 2000 interface box.
 - c. Remove faulty SmartClass 2000 interface box.
- d. Configure replacement SmartClass 2000 interface box exactly as the faulty interface box is configured.
 - e. Install replacement SmartClass 2000 interface box.
 - f. Reconnect equipment connected to SmartClass 2000 interface box.
- g. Return any equipment powered off to normal operation IAW procedure in chapter 2.

5-54. ULTRA 10 WORKSTATION.

- a. Shut down/power OFF Ultra 10 workstation IAW procedures in chapter 3.
- b. Remove and replace faulty component(s) IAW ITI 2WS-ULTRA5/10-2 making sure to note location of all connectors and label all cables prior to disconnecting from faulty component(s).
 - c. Reconnect cables and connectors to replacement component(s).

d. Return any equipment powered off to normal operation IAW procedure in chapter 2.

5-55. ULTRA ENTERPRISE 450 SERVER.

- a. Shut down/power OFF Ultra Enterprise 450 Server and peripherals IAW procedure in chapter 3.
- b. Disconnect all connectors and cable from faulty component making sure to note location of all connectors and label all cables prior to disconnecting.
- c. Remove and replace faulty component(s) IAW ITI 2WS-ULTRA/E450-1 for the server and ITI 2WS-SPARC/DLT-7000-1 for the external tape drive.
 - d. Reconnect all connectors and cables disconnected in step 5-55. b.
- e. Reactivate Ultra Enterprise 450 Server and peripherals IAW procedure in chapter 2.
 - f. If problem still exists, perform paragraph 5-56.
- a. Shut down and power OFF entire Training System IAW procedures in chapter 3.
- b. Disconnect all connectors and cables from faulty hub making sure to note location of connectors and label all cables prior to disconnecting.
 - c. Remove and replace faulty hub IAW ITI 2SE-CISCO/HUB400-7.
 - d. Reconnect all connectors and cables disconnected in step 5-56. b.
 - e. Reactivate entire Training System IAW procedure in chapter 2.

SECTION II

PREVENTIVE MAINTENANCE

- 5-57. PREVENTIVE MAINTENANCE INSTRUCTIONS.
- 5-58. GENERAL.
- 5-59. Section provides a list of Preventive Maintenance Instructions/Preventive Maintenance Routines (PMI/PMRs) for the US NDC Training System.
- 5-60. PREVENTIVE MAINTENANCE INSTRUCTIONS/PREVENTIVE MAINTENANCE ROUTINES.
- 5-61. PMI/PMRs required for the US NDC Training System are located in TI 2-1-6. The US NDC Training System PMI/PMRs are as follows:
 - a. Cleaning and inspecting the Ultra 10 units.
 - b. Cleaning and inspecting the E450 Server unit.

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CHAPTER 6

ILLUSTRATED PARTS BREAKDOWN

6-1. INTRODUCTION.

6-2. Chapter 6 contains illustrations, listings and descriptions of the parts and assemblies which comprise the United States National Data Center (US NDC) Training System. The illustrations in this chapter identify the parts of the equipment at a top level. Each figure represents an assembly or end item and each of its subassemblies or components. Each assembly, subassembly, end item or component is then listed in the Group Assembly Parts List (GAPL).

SECTION I

GENERAL INFORMATION

6-3. GENERAL.

6-4. This section provides information for illustration grouping, end items, and means of locating parts. This chapter is intended to be used in conjunction with the wiring diagrams and tables in chapter 7 and with the applicable commercial off-the-shelf (COTS) manual or identifying technical instruction (ITI) identified in chapter 1. It is also recommended that maintenance personnel use the removal and replacement procedures in chapter 5 and the partition information in appendix 2 when removing and replacing parts identified in this chapter.

6-5. ILLUSTRATION GROUPING.

6-6. The illustrations for the US NDC Training System are grouped with each item followed by illustrations of components or assemblies for that item. Each illustration is followed by a GAPL.

6-7. END ITEMS AND ASSEMBLIES.

6-8. Figure 6-1 through figure 6-5 illustrate the various items, their assemblies and components for the US NDC Training System. Each assembly or component is illustrated and listed immediately after the major assembly or component of which it is a part.

6-9. LOCATING A PART.

- 6-10. HOW TO USE THE GAPL WHEN THE PART NUMBER IS KNOWN.
- 6-11. If the part number is known, refer to the applicable GAPL. Scan the PART NUMBER column until the known part number is located. The FIG & INDEX NO column will reference the part to a specific illustration (figure number) which shows the location (index number) of the part. The MFR CODE column identifies the manufacturer of the part by a five-digit number. The DESCRIPTION column describes the assembly and each of its parts.
- 6-12. HOW TO USE THE GAPL WHEN THE PART NUMBER IS UNKNOWN.
- 6-13. If the part number is unknown, see figure 6-2 through figure 6-5 to locate the part. Determine the figure number and index number associated with the part to be identified. Refer to the corresponding FIG & INDEX NO column in the appropriate GAPL. The part number, manufacturer's code, and nomenclature are provided in the GAPL adjacent to the illustrated index number references.

SECTION II

REFERENCE DESIGNATIONS

6-14. GENERAL.

- 6-15. This section provides information on the interpretation of the reference designators (REF. DES.) shown in column five of the GAPL. A REF. DES. provides a unique alphanumeric identification for each system, subsystem, assembly and subassembly comprising the US NDC.
- 6-16. REF. DES. for items within the US NDC Training System begin with an uppercase CT. The number following the system identifier indicates the major subassembly of the US NDC Training System. Subsequent A numbers indicate the subordinate assembly and subassembly indention levels of the system hardware configuration. Appendix 1 provides a cross-reference list of REF. DES. versus system and subsystem functional names.
- 6-17. Interconnection cabling REF. DES. begin with an uppercase W followed by the cable number. Chapter 7 contains the system wiring diagrams and a list of cables with their descriptions and REF. DES.

SECTION III

GROUP ASSEMBLY PARTS LIST

6-18. **GENERAL**.

6-19. This section describes the use of the GAPL which is located immediately after the applicable illustration.

6-20. GROUP ASSEMBLY PARTS LIST.

- 6-21. The GAPL contains five columns and includes the figures and index number, the part number, the manufacturer's code, the description, and the reference designations for the subsystem, assembly or subassembly.
- 6-22. FIG. AND INDEX NO.
- 6-23. Column one supplies the key to the illustrations. The complete identification of a part consists of the figure number followed by a dash, and the index number. The figure number appears only once within each GAPL, at the first entry. Each part is then identified in the list by the index number which corresponds to a number on the applicable illustration.

- 6-24. PART NUMBER.
- 6-25. Column two provides the part number for the item listed. Not all listed items have part numbers assigned. For these items, sufficient information is presented in column four to identify the part. The part numbers are used to order replacement parts.
- 6-26. MFR CODE.
- 6-27. Column three contains a five-digit code identifying the manufacturer. Those items with MFR CODE 1JPW3 are manufactured at the depot.
- 6-28. DESCRIPTION.
- 6-29. Column four contains the name and description of each part listed. For some parts, the description may consist of the name only. For others, the description may consist of the name modifiers and details necessary to identify a part.
- 6-30. REF. DES.
- 6-31. Column five contains the REF. DES. for the items listed. Reference designators are further described in section II.

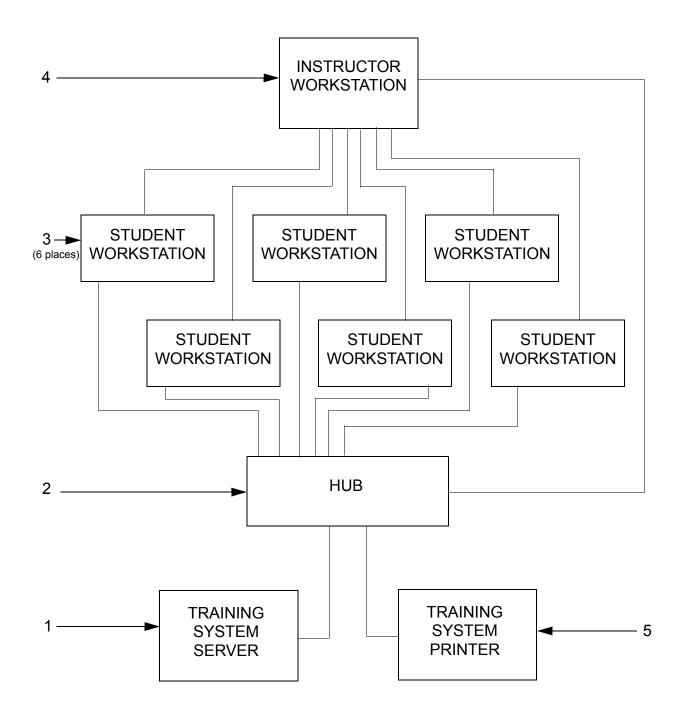


Figure 6-1. Training System

| FIG. & INDEX NO. | PART NUMBER | MFR | DESCRIPTION | REF. DES. |
|------------------------|-------------|-------|---|---------------------------|
| 6-1- | | 1JPW3 | US NDC TRAINING SYSTEM | |
| 1 | | 1JPW3 | . TRAINING SYSTEM SERVER (See figure 6-2) | CT1A1 |
| 2 | | 0GX96 | . HUB (See figure 6-3) | CT1A10 |
| 3 | | 1JPW3 | . STUDENT WORKSTATION (See figure 6-3) | CT1A3 through CT1A8 |
| 4 | | 1JPW3 | . INSTRUCTOR WORKSTATION (See figure 6-4) | CT1A2 |
| 5 | | 1JPW3 | . TRAINING SYSTEM PRINTER (See figure 6-5) | CT1A9 |

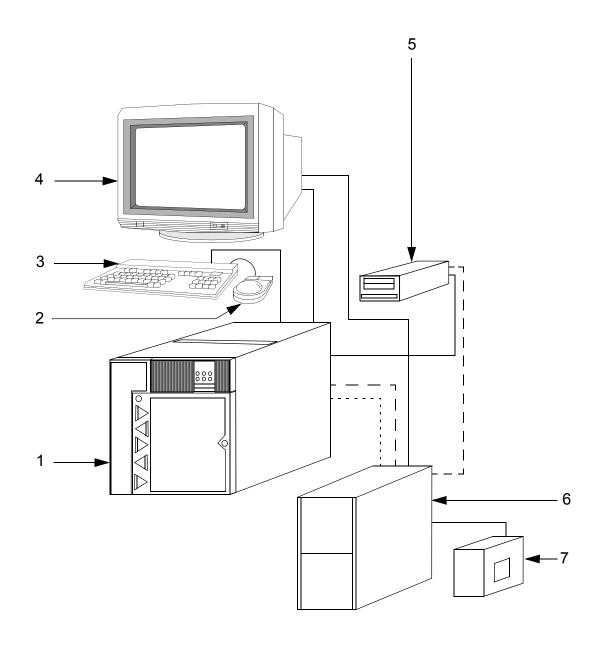


Figure 6-2. Training System Server

| FIG. & INDEX NO. | PART NUMBER | MFR | DESCRIPTION | REF. DES. |
|------------------|---------------------------|-------|--|--------------|
| 6-2- | | | . TRAINING SYSTEM SERVER (See figure 6-1 for NHA) | CT1A1 |
| 1 | E450 | 7X430 | PROCESSOR, Ultra Enterprise 450 | |
| | 375-0013 | 7X430 | PCI CARD, Ultra SCSI Controller, Dual Single-Ended (2 ea) (not shown) | |
| | 370-3753 | 7X430 | PCI CARD, PGX 32 Graphics Frame Buffer (not shown) | |
| 2 | 370-1586 | 7X430 | MOUSE | |
| 3 | 320-1270 | 7X430 | KEYBOARD with cable | |
| 4 | 365-1399 | 7X430 | MONITOR, 21-in. Color, w/13W3 Cable | |
| | EVNSL05A w/ 2 ea FM730 | 1JPW3 | CABLE, RJ45 10/100 Base-T | W79 |
| 5 | X6060A | 7X430 | TAPE DRIVE, External, DLT 7000 | |
| | 530-2383-01 | 7X430 | CABLE, SCSI, External | W78 |
| 6 | SU3000NET | 0MG77 | UNINTERRUPTIBLE POWER SUPPLY, SmartUPS 3000 | |
| 7 | SU48BP | 0MG77 | BATTERY PACK, SU3000NET | |
| | 180-1179 | 7X430 | POWER CORD, ac, 6 ft | |

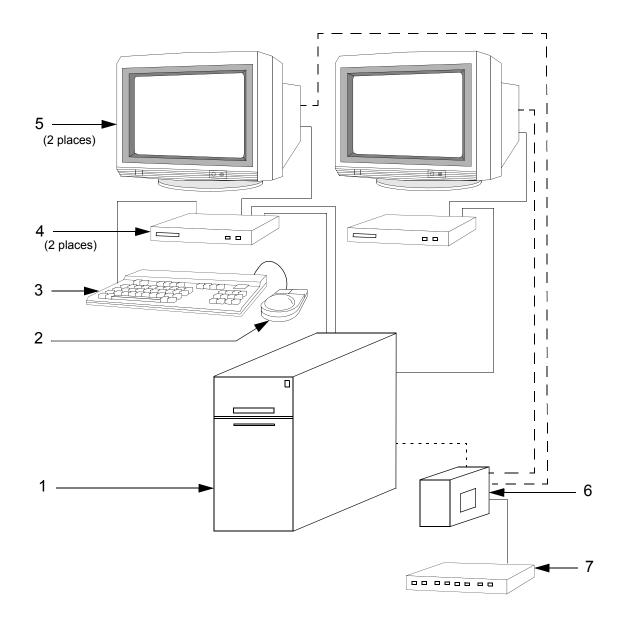


Figure 6-3. Student Workstation

| FIG. & INDEX NO. | PART NUMBER | MFR | DESCRIPTION | REF. DES. |
|------------------------|---------------------------|-------|--|---|
| 6-3- | | | . STUDENT WORKSTATION (See figure 6-1 for NHA) | CT1A3 through CT1A8 |
| 1 | Ultra 10 | 7X430 | WORKSTATION, Ultra 10 | |
| | 370-2256 | 7X430 | CARD, Frame Buffer, PGX Color | |
| 2 | 370-1586 | 7X430 | MOUSE | |
| 3 | 320-1270 | 7X430 | KEYBOARD with cable | |
| 4 | SC 2000i SUN | 3AH70 | INTERFACE BOX, SmartClass 2000 | |
| 5 | 365-1399 | 7X430 | MONITOR, 21-in. Color, w/13W3 Cable | |
| | 530-2357 | 7X430 | CABLE, Monitor Adapter | W83, W86, W89, W92, W95, W98, W101 through W106 |
| 6 | BP1400 | 0MG77 | UNINTERRUPTIBLE POWER SUPPLY, BackUPS Pro 1400 | |
| 7 | WS-C4212 | 0GX96 | HUB, Cisco FastHub 400 | CT1A10 |
| | 180-1179 | 7X430 | POWER CORD, ac, 6 ft | |
| | EVNSL05A w/ 2 ea FM730 | 1JPW3 | CABLE, RJ45 10/100 Base-T | W21, W35, W46, W56, W65, W73 |

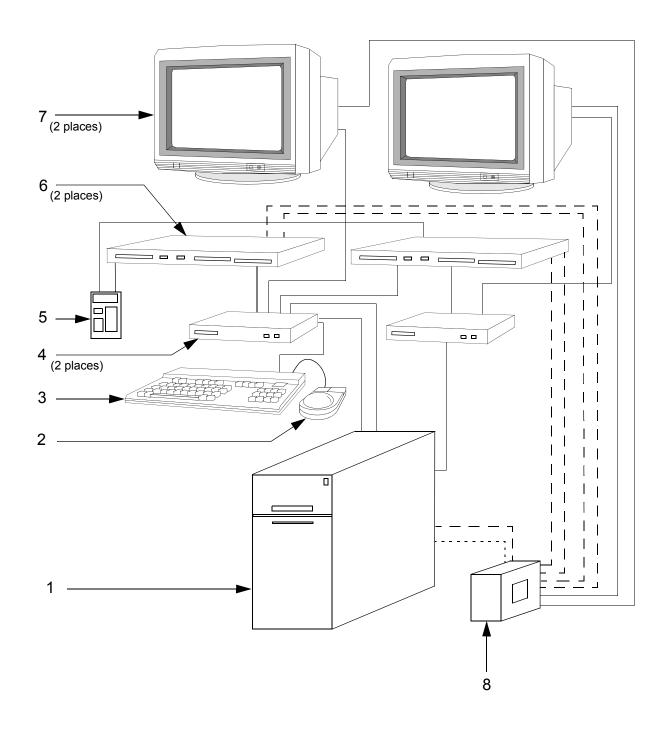


Figure 6-4. Instructor Workstation

| FIG. & INDEX NO. | PART NUMBER | MFR | DESCRIPTION | REF. DES. |
|------------------------|---------------------------|-------|--|----------------|
| 6-4- | | | . INSTRUCTOR WORKSTATION (See figure 6-1 for NHA) | CT1A2 |
| 1 | Ultra 10 | 7X430 | WORKSTATION, Ultra 10 | |
| | 370-2256 | 7X430 | CARD, Frame Buffer, PGX Color | |
| 2 | 370-1586 | 7X430 | MOUSE | |
| 3 | 320-1270 | 7X430 | KEYBOARD with cable | |
| 4 | SC 2000i SUN | 3AH70 | INTERFACE BOX, SmartClass 2000 | |
| 5 | SC 2000C | 3AH70 | CONTROL UNIT, SmartClass 2000 | |
| 6 | SC 2000JU | 3AH70 | JUNCTION BOX, SmartClass 2000 | |
| | SC 2000LD | 3AH70 | LOOP DOUBLER, with cable | W1 |
| 7 | 365-1399 | 7X430 | MONITOR, 21-in. Color, w/13W3 Cable | |
| | 530-2357 | 7X430 | CABLE, Monitor Adapter | W81, W100 |
| 8 | SU2000NET | 0MG77 | UNINTERRUPTIBLE POWER SUPPLY, SmartUPS 2200 | |
| | EVNSL05A w/ 2 ea FM730 | 1JPW3 | CABLE, RJ45 10/100 Base-T | W2, W3, W20 |

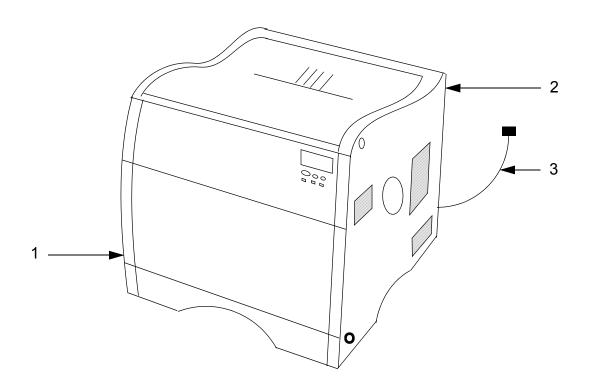


Figure 6-5. Training System Printer

| FIG. & INDEX NO. | PART NUMBER | MFR | DESCRIPTION | REF. DES. |
|------------------------|---------------------------|-------|--|--------------|
| 6-5- | | | . TRAINING SYSTEM PRINTER (See figure 6-1 for NHA) | CT1A9 |
| 1 | C710dn | 0RVN4 | PRINTER, Laser, Lexmark C710 | |
| 2 | 99A0421 | 05487 | CARD, Internal Network Adapter Option | |
| 3 | EVNSL71A w/ 2 ea FM733 | 59951 | CABLE, RJ45 10/100 Base-T | W74 |

CHAPTER 7

CIRCUIT DIAGRAMS

7-1. INTRODUCTION.

7-2. Chapter 7 provides the United States National Data Center (US NDC) Training System wire list, Robotel SmartClass 2000 interface box jumper settings information, system interconnection diagram, hardware connectivity diagram, and power distribution diagram. The wire list, jumper settings table, and diagrams support the maintenance and operation of the Training System.

7-3. GENERAL.

- 7-4. SMARTCLASS 2000 INTERFACE CONTROL BOX JUMPER SETTINGS.
- 7-5. It is necessary to properly configure the jumper settings located on the SmartClass 2000 interface control boxes attached to each Instructor and Student Workstation. The two interface boxes attached to each workstation will be configured exactly alike. Figure 7-1 provides the information necessary to properly configure the boxes. In figure 7-1, each workstation is listed below an illustration of the jumper settings for the interface boxes attached to that particular workstation.
- 7-6. WIRE LIST AND CABLING DIAGRAMS.
- 7-7. Table 7-1 provides a listing of the signal cables used in the US NDC System. The CABLE NO. column identifies the reference designator (REF. DES.) for the cable listed. The PART NUMBER column identifies the part number for the cable and the DESCRIPTION column describes the cable type. The FROM and TO columns identify the point-to-point connection for each cable. The Training System Interconnection Diagram in figure 7-3 illustrates the system external data cable interconnections.
- 7-8. HARDWARE CONNECTIVITY DIAGRAM.
- 7-9. The Training System Connectivity Diagram (see figure 7-3) provides pictorial blocks and overall connectivity of the major hardware configuration items for the Training System.
- 7-10. POWER DISTRIBUTION DIAGRAM.
- 7-11. Figure 7-4 shows the Training System Power Distribution Diagram.

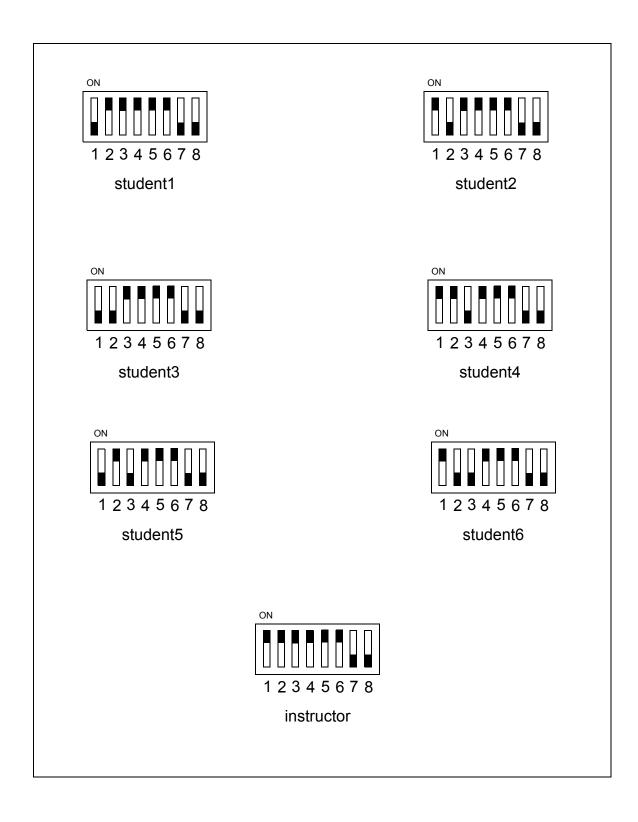


Figure 7-1. Robotel Interface Control Box Jumper Settings

Table 7-1. US NDC Training System Cable List

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|----------------------------------|--|---|
| W1 | SC 2000LD | Loop Doubler Cable | Control Box (CT1A2A9J1) | Loop Doubler (CT1A2A11J1) |
| W2 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | Loop Doubler (CT1A2A11J2) | instructor Junction Box 2 (CT1A2A6J1) |
| W3 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | Loop Doubler (CT1A2A11J3) | instructor Junction Box 1 (CT1A2A5J1) |
| W4 | 160 CA5R003 | 3 ft Interface Cable | instructor Junction Box 1 (CT1A2A5J2) | instructor Interface Box 1 (CT1A2A7J1) |
| W5 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | instructor Interface Box 1 (CT1A2A7J2) | instructor Monitor 1 (W80P2) (CT1A2A2J1) |
| W6 | 160 CA5R043 | 43 ft Interface Cable | instructor Interface Box 1 (CT1A2A7J3) | student1 Interface Box 1 (CT1A3A5J1) |
| W7 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | instructor Interface Box 1 (CT1A2A7J4) | instructor Ultra 10/440 (CT1A2A1J3) |
| W8 | RAL DB15HDF/13W3M | SUN DB15HD M to 13W3 F Cable | instructor Interface Box 1 (CT1A2A7J5) | instructor Ultra 10/440 (W100P2) (CT1A2A1J4) |
| W9 | 320-1233 | Type 5 Keyboard w/ Cable | instructor Interface Box 1 (CT1A2A7J6) | instructor Keyboard/Mouse (CT1A2A4J1) |
| W10 | RAL DB15HDF/13W3M | SUN DB15HD M to 13W3 F Cable | instructor Interface Box 2 (CT1A2A8J2) | instructor Ultra 10/440 (W81P1) (CT1A2A1J2) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|--|---|---|
| W11 | 160 CA5R003 | 3 ft Interface Cable | instructor Junction Box 2 (CT1A2A6J2) | instructor Interface Box 2 (CT1A2A8J1) |
| W12 | RAL DB15HDF/13W3M | SUN DB15HD M to 13W3 F Cable | instructor Interface Box 2 (CT1A2A8J4) | instructor Monitor 2 (W81P2) (CT1A2A3J1) |
| W13 | AP9823 | Simple Signaling UNIX Cable | instructor Ultra 10/440 (CT1A2A1J1) | instructor UPS (CT1A2A10J1) |
| W14 | 160 CA5R043 | 43 ft Interface Cable | instructor Interface Box 2 (CT1A2A8J3) | student1 Interface Box 2 (CT1A3A6J1) |
| W15 | RAL DB15HDF/13W3M | SUN DB15HD M to 13W3 F Cable | student1 Interface Box 1 (CT1A3A5J2) | student1 Monitor 1 (W16P2) (CT1A3A2J1) |
| W16 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student1 Interface Box 1 (W15P1) (CT1A3A5J2) | student1 Monitor 1 (CT1A3A2J1) |
| W17 | 320-1233 | Type 5 Keyboard w/ Cable | student1 Interface Box 1 (CT1A3A5J6) | student1 Keyboard/Mouse (CT1A3A4J1) |
| W18 | RAL DB15HDF/13W3M | SUN DB15HD M to 13W3 F Cable | student1 Interface Box 1 (CT1A3A5J5) | student1 Ultra 10/440 (W101P2) (CT1A3A1J4) |
| W19 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student1 Interface Box 1 (CT1A3A5J4) | student1 Ultra 10/440 (CT1A3A1J3) |
| W20 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J1) | instructor Ultra 10/440 (CT1A2A1J5) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|----------------------------------|---|---|
| W21 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J2) | student1 Ultra 10/440 (CT1A3A1J5) |
| W22 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student1 Interface Box 2 (CT1A3A6J2) | student1 Ultra 10/440 (W83P1) (CT1A3A1J2) |
| W23 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student1 Ultra 10/440 (CT1A3A6J4) | student1 UPS (CT1A3A3J1) |
| W24 | AP9823 | Simple Signaling UNIX Cable | student1 Interface Box 2 (CT1A3A1J1) | student2 Interface Box 2 (CT1A3A7J1) |
| W25 | 160 CA5R013 | 13 ft Interface Cable | student1 Interface Box 1 (CT1A3A6J3) | student2 Interface Box 1 (CT1A4A6J1) |
| W26 | 160 CA5R013 | 13 ft Interface Cable | student2 Interface Box 1 (CT1A3A5J3) | student3 Interface Box 1 (CT1A4A5J1) |
| W27 | 160 CA5R013 | 13 ft Interface Cable | student2 Interface Box 1 (CT1A4A5J3) | student2 Ultra 10/440 (CT1A5A5J1) |
| W28 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student2 Interface Box 1 (CT1A4A5J4) | student2 Ultra 10/440 (W102P2) (CT1A4A1J3) |
| W29 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student2 Interface Box 1 (CT1A4A5J5) | student2 Keyboard/Mouse (CT1A4A1J4) |
| W30 | 320-1233 | Type 5 Keyboard w/ Cable | student2 Interface Box 1 (W85P1) (CT1A4A5J6) | student2 Monitor 1 (CT1A4A4J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|--|---|---|
| W31 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student2 Interface Box 2 (CT1A4A5J2) | student2 Ultra 10/440 (W86P1) (CT1A4A2J1) |
| W32 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student1 Ultra 10/440 (CT1A4A6J2) | student1 UPS (CT1A4A1J2) |
| W33 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student2 Interface Box 2 (CT1A4A6J4) | student2 Monitor 2 (W87P2) (CT1A4A3J1) |
| W34 | AP9823 | Simple Signaling UNIX Cable | student2 Ultra 10/440 (CT1A4A1J1) | student2 UPS (CT1A4A7J1) |
| W35 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J3) | student2 Ultra 10/440 (CT1A4A1J5) |
| W36 | 160 CA5R013 | 13 ft Interface Cable | student2 Interface Box 2 (CT1A4A6J3) | student3 Interface Box 2 (CT1A5A6J1) |
| W37 | 160 CA5R013 | 13 ft Interface Cable | student3 Interface Box 1 (CT1A5A5J3) | student4 Interface Box 1 (CT1A6A5J1) |
| W38 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student3 Interface Box 1 (CT1A5A5J4) | student3 Ultra 10/440 (CT1A5A1J3) |
| W39 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student3 Interface Box 1 (CT1A5A5J5) | student3 Ultra 10/440 (W103P2) (CT1A5A1J4) |
| W40 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student3 Interface Box 1 (W88P1) (CT1A5A5J2) | student3 Monitor 1 (CT1A5A2J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|--|---|---|
| W41 | 320-1233 | Type 5 Keyboard w/ Cable | student3 Interface Box 1 (CT1A5A5J6) | student3 Keyboard/Mouse (CT1A5A4J1) |
| W42 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student3 Interface Box 2 (CT1A5A6J2) | student3 Ultra 10/440 (W89P1) (CT1A5A1J2) |
| W43 | 160 CA5R013 | 13 ft Interface Cable | student3 Interface Box 2 (CT1A5A6J3) | student4 Interface Box 2 (CT1A6A6J1) |
| W44 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student3 Interface Box 2 (CT1A5A6J4) | student3 Monitor 2 (W90P2) (CT1A5A3J1) |
| W45 | AP9823 | Simple Signaling UNIX Cable | student3 Ultra 10/440 (CT1A5A1J1) | student3 UPS (CT1A5A7J1) |
| W46 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J4) | student3 Ultra 10/440 (CT1A5A1J5) |
| W47 | 160 CA5R013 | 13 ft Interface Cable | student4 Interface Box 1 (CT1A6A5J3) | student5 Interface Box 1 (CT1A7A5J1) |
| W48 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student4 Interface Box 1 (CT1A6A5J4) | student4 Ultra 10/440 (CT1A6A1J3) |
| W49 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student4 Interface Box 1 (CT1A6A5J5) | student4 Ultra 10/440 (W104P2) (CT1A6A1J4) |
| W50 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student4 Interface Box 1 (W91P1) (CT1A6A5J2) | student4 Monitor 1 (CT1A6A2J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|----------------------------------|--|---|
| W51 | 320-1233 | Type 5 Keyboard w/ Cable | student4 Interface Box 1 (CT1A6A5J6) | student4 Keyboard/Mouse (CT1A6A4J1) |
| W52 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student4 Interface Box 2 (CT1A6A6J2) | student4 Ultra 10/440 (W92P1) (CT1A6A1J2) |
| W53 | 160 CA5R013 | 13 ft Interface Cable | student4 Interface Box 2 (CT1A6A6J3) | student5 Interface Box 2 (CT1A7A6J1) |
| W54 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student4 Interface Box 2 (CT1A6A6J4) | student4 Monitor 2 (W93P2) (CT1A6A3J1) |
| W55 | AP9823 | Simple Signaling UNIX Cable | student4 Ultra 10/440 (CT1A6A1J1) | student4 UPS (CT1A6A7J1) |
| W56 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J5) | student4 Ultra 10/440 (CT1A6A1J5) |
| W57 | 160 CA5R013 | 13 ft Interface Cable | student5 Interface Box 1 (CT1A7A5J3) | student6 Interface Box 1 (CT1A8A5J1) |
| W58 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student5 Interface Box 1 (CT1A7A5J4) | student5 Ultra 10/440 (CT1A7A1J3) |
| W59 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student5 Interface Box 1 (CT1A7A5J5) | student5 Ultra 10/440 (W105P2) (CT1A7A1J4) |
| W60 | 320-1233 | Type 5 Keyboard w/ Cable | student5 Interface Box 1 (CT1A7A5J6) | student5 Keyboard/Mouse (CT1A7A4J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|--|---|---|
| W61 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student5 Interface Box 1 (W94P1) (CT1A7A5J2) | student5 Monitor 1 (CT1A7A2J1) |
| W62 | 160 CA5R013 | 13 ft Interface Cable | student5 Interface Box 2 (CT1A7A6J3) | student6 Interface Box 2 (CT1A8A6J1) |
| W63 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student5 Interface Box 2 (CT1A7A6J4) | student5 Monitor 2 (W96P2) (CT1A7A3J1) |
| W64 | AP9823 | Simple Signaling UNIX Cable | student5 Ultra 10/440 (CT1A7A1J1) | student5 UPS (CT1A7A7J1) |
| W65 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J6) | student5 Ultra 10/440 (CT1A7A1J5) |
| W66 | RAL DB9F/MINI8DIN | SUN DB9F to MINI8 DIN M Cable | student6 Interface Box 1 (CT1A8A5J3) | student6 Ultra 10/440 (CT1A8A1J3) |
| W67 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student6 Interface Box 1 (CT1A8A5J4) | student6 Ultra 10/440 (W106P2) (CT1A8A1J4) |
| W68 | 320-1233 | Type 5 Keyboard w/ Cable | student6 Interface Box 1 (CT1A8A5J5) | student6 Keyboard/Mouse (CT1A8A4J1) |
| W69 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student6 Interface Box 1 (W97P1) (CT1A8A5J2) | student6 Monitor 1 (CT1A8A2J1) |
| W70 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student6 Interface Box 2 (CT1A8A6J2) | student6 Ultra 10/440 (W98P1) (CT1A8A1J2) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|---------------------------|--|---|---|
| W71 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student6 Interface Box 2 (CT1A8A6J3) | student6 Monitor 2 (W99P2) (CT1A8A3J1) |
| W72 | AP9823 | Simple Signaling UNIX Cable | student6 Ultra 10/440 (CT1A8A1J1) | student6 UPS (CT1A8A7J1) |
| W73 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J7) | student6 Ultra 10/440 (CT1A8A1J5) |
| W74 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J8) | tsprinter (CT1A9A1J1) |
| W75 | AP9823 | Simple Signaling UNIX Cable | tsserver E450 (CT1A1A1J5) | tsserver UPS (CT1A1A5J1) |
| W76 | 320-1233 | Type 5 Keyboard w/ Cable | tsserver E450 (CT1A1A1J2) | tsserver Keyboard/Mouse (CT1A1A4J1) |
| W77 | 365-1354 | 17-in. Monitor Cable | tsserver E450 (CT1A1A1J3) | tsserver Monitor (CT1A1A3J1) |
| W78 | 530-2383-01 | External SCSI Cable | tsserver DLT 7000 (CT1A1A2J1) | tsserver E450 (CT1A1A1J1) |
| W79 | EVNSL05A w/ 2 ea FM730 | RJ45 Ethernet Cable | CISCO 400 (CT1A10A1J9) | tsserver E450 (CT1A1A1J4) |
| W80 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | instructor Interface Box 1 (W5P1) (CT1A2A7J2) | instructor Monitor 1 (CT1A2A2J1) |
| W81 | 530-2357 | Monitor Cable Adapter | instructor Interface Box 2 (W10P1) (CT1A2A8J2) | instructor Ultra 10/440 (CT1A2A1J2) |

Table 7-1. US NDC Training System Cable List (Cont)

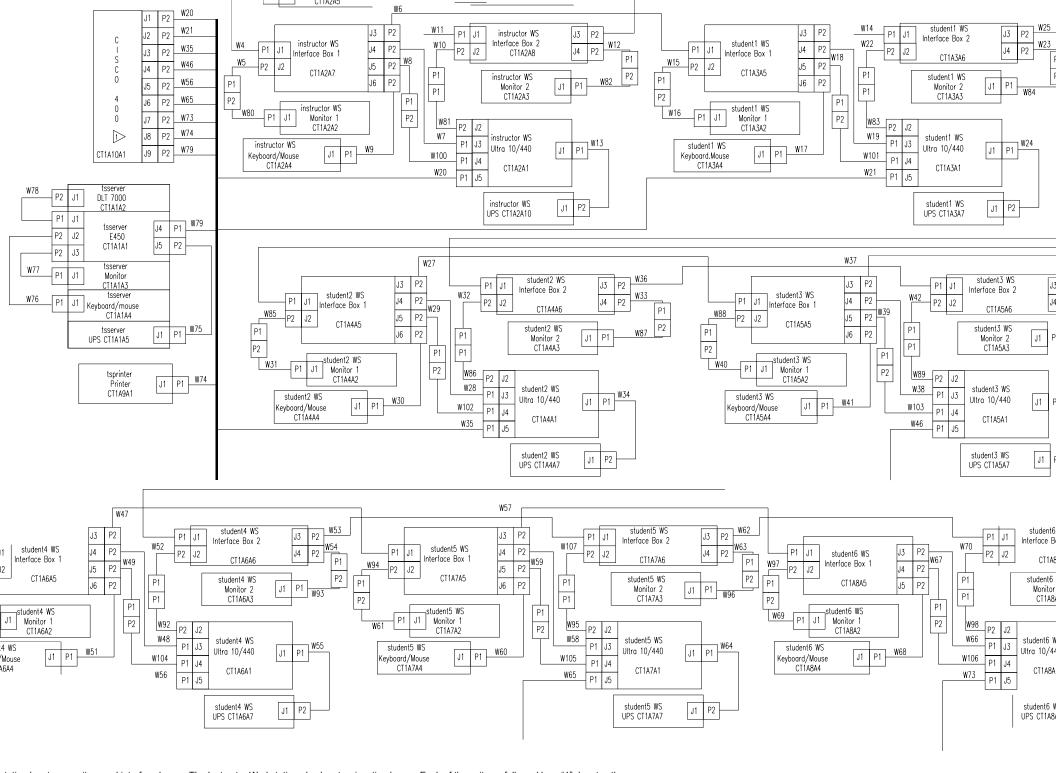
| CABLE | | | FROM | то |
|-------|----------------------|--|---|---|
| NO. | PART NUMBER | DESCRIPTION | (REF. DES.) | (REF. DES.) |
| W82 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | instructor Interface Box 2 (W12P1) (CT1A2A8J4) | instructor Monitor 2 (CT1A2A3J1) |
| W83 | 530-2357 | Monitor Cable Adapter | student1 Interface Box 2 (W22P1) (CT1A3A6J2) | student1 Ultra 10/440 (CT1A3A1J2) |
| W84 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student1 Interface Box 2 (W23P1) (CT1A3A6J4) | student1 Monitor 2 (CT1A3A3J1) |
| W85 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student2 Interface Box 1 (CT1A4A5J2) | student2 Monitor 1 (W31P2) (CT1A4A2J1) |
| W86 | 530-2357 | Monitor Cable Adapter | student2 Interface Box 2 (W32P1) (CT1A4A6J2) | student2 Ultra 10/440 (CT1A4A1J2) |
| W87 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student2 Interface Box 2 (W33P1) (CT1A4A6J4) | student2 Monitor 2 (CT1A4A3J1) |
| W88 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student3 Interface Box 1 (CT1A5A5J2) | student3 Monitor 1 (W40P2) (CT1A5A2J1) |
| W89 | 530-2357 | Monitor Cable Adapter | student3 Interface Box 2 (W42P1) (CT1A5A6J2) | student3 Ultra 10/440 (CT1A5A1J2) |
| W90 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student3 Interface Box 2 (W44P1) (CT1A5A6J4) | student3 Monitor 2 (CT1A5A3J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|----------------------|--|--|---|
| W91 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student4 Interface Box 1 (CT1A6A5J2) | student4 Monitor 1 (W50P2) (CT1A6A2J1) |
| W92 | 530-2357 | Monitor Cable Adapter | student4 Interface Box 2 (W52P1) (CT1A6A6J2) | student4 Ultra 10/440 (CT1A6A1J2) |
| W93 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student4 Interface Box 2 (W54P1) (CT1A6A6J4) | student4 Monitor 2 (CT1A6A3J1) |
| W94 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student5 Interface Box 1 (CT1A7A5J2) | student5 Monitor 1 (W61P2) (CT1A7A2J1) |
| W95 | 530-2357 | Monitor Cable Adapter | student5 Interface Box 2 (W107P1) (CT1A7A6J2) | student5 Ultra 10/440 (CT1A7A1J2) |
| W96 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student5 Interface Box 2 (W63P1) (CT1A7A6J4) | student5 Monitor 2 (CT1A7A3J1) |
| W97 | RAL DB15HDF/13W3M | SUN DB15HD F to 13W3 M Cable | student6 Interface Box 1 (CT1A8A5J2) | student6 Monitor 1 (W69P2) (CT1A8A2J1) |
| W98 | 530-2357 | Monitor Cable Adapter | student6 Interface Box 2 (W70P1) (CT1A8A6J2) | student6 Ultra 10/440 (CT1A8A1J2) |
| W99 | 365-1399 | 21-in. Color Monitor w/ 13W3 Cable | student6 Interface Box 2 (W71P1) (CT1A8A6J3) | student6 Monitor 2 (CT1A8A3J1) |

Table 7-1. US NDC Training System Cable List (Cont)

| CABLE NO. | PART NUMBER | DESCRIPTION | FROM (REF. DES.) | TO (REF. DES.) |
|--------------|----------------------|---------------------------------|--|--|
| W100 | 530-2357 | Monitor Cable Adapter | instructor Interface Box 1 (W8P1) (CT1A2A7J5) | instructor Ultra 10/440 (CT1A2A1J4) |
| W101 | 530-2357 | Monitor Cable Adapter | student1 Interface Box 1 (W18P1) (CT1A3A5J5) | student1 Ultra 10/440 (CT1A3A1J4) |
| W102 | 530-2357 | Monitor Cable Adapter | student2 Interface Box 1 (W29P1) (CT1A4A5J5) | student2 Ultra 10/440 (CT1A4A1J4) |
| W103 | 530-2357 | Monitor Cable Adapter | student3 Interface Box 1 (W39P1) (CT1A5A5J5) | student3 Ultra 10/440 (CT1A5A1J4) |
| W104 | 530-2357 | Monitor Cable Adapter | student4 Interface Box 1 (W49P1) (CT1A6A5J5) | student4 Ultra 10/440 (CT1A6A1J4) |
| W105 | 530-2357 | Monitor Cable Adapter | student5 Interface Box 1 (W59P1) (CT1A7A5J5) | student5 Ultra 10/440 (CT1A7A1J4) |
| W106 | 530-2357 | Monitor Cable Adapter | student6 Interface Box 1 (W67P1) (CT1A8A5J4) | student6 Ultra 10/440 (CT1A8A1J4) |
| W107 | RAL DB15HDM/13W3F | SUN DB15HD M to 13W3 F Cable | student5 Interface Box 2 (CT1A7A6J2) | student5 Ultra 10/440 (W95P1) (CT1A7A1J2) |



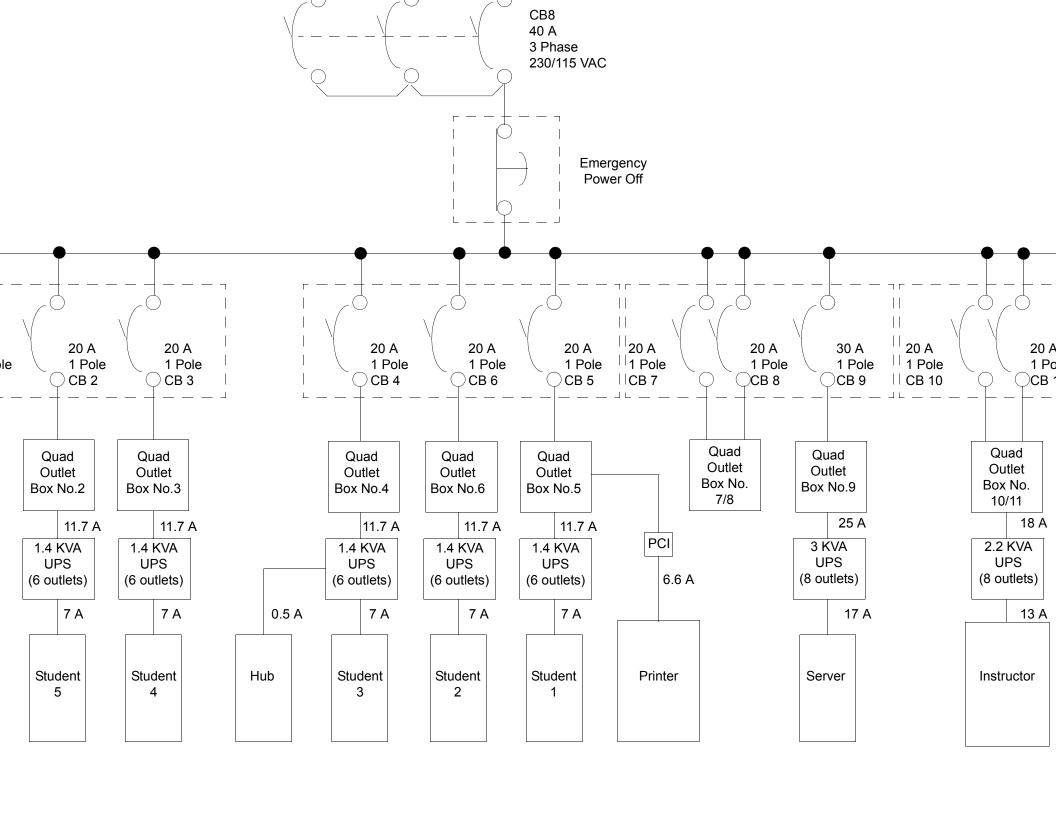
station has two monitors and interface boxes. The Instructor Workstation also has two junction boxes. Each of these items followed by a "1" denotes the d be located on the left side when facing the workstation and each item followed by a "2" denotes the item should be located on the right side.

Figure 7-2. Training Syste

TSSERVER
ULTRA ENTERPRISE 450
REF DES CT1A1 ADDITIONAL BATTERY DLT7000 3KVA UPS TSPRINTER LEXMARK PRINTER REF DES CT1A9 TRAINING SERVER SUBSYSTEM HUB CISCO FASTHUB 400 REF DES CT1A10 1.4KVA UPS 1.4KVA UPS 1.4KVA UPS STUDENT4
SUN ULTRA 10/440
REF DES CTIA6 STUDENT1
SUN ULTRA 10/440
REF DES CT1A3 STUDENT5
SUN ULTRA 10/440
REF DES CT1A7 SUN ULTRA 10/440
REF DES CT1A4 SUN ULTRA 10/440
REF DES CT1A5

FACE 21 CORT 22 CORT 22 CORT UPS

INSTRUCTOR SUBSYSTEM



APPENDIX 1

US NDC TRAINING SYSTEM NOMENCLATURE CROSS-REFERENCE LIST

1A-1. INTRODUCTION.

1A-2. Appendix 1 provides a cross-reference list of machines on the United States National Data Center (US NDC) Training System. Table 1A-1 lists each machine on the Training System in order of their Reference Designator (REF. DES.) number which is listed in the first column. The second and third columns list the functional and machine name for each workstation or equipment item.

Table 1A-1. Training System Nomenclature Cross-Reference List

| REF. DES. | FUNCTIONAL NAME | MACHINE NAME |
|-----------|-------------------------|-----------------|
| CT1 | Training System | |
| CT1A1 | Training System Server | tsserver |
| CT1A2 | Instructor Workstation | instructor |
| CT1A3 | Student Workstation 1 | student1 |
| CT1A4 | Student Workstation 2 | student2 |
| CT1A5 | Student Workstation 3 | student3 |
| CT1A6 | Student Workstation 4 | student4 |
| CT1A7 | Student Workstation 5 | student5 |
| CT1A8 | Student Workstation 6 | student6 |
| CT1A9 | Training System Printer | tsprinter |
| CT1A10 | Remote Hub | hub |

APPENDIX 2

US NDC TRAINING SYSTEM DISK PARTITION TABLES

2A-1. INTRODUCTION.

- 2A-2. Appendix 2 provides disk partition information for the United States National Data Center (US NDC) Training System. Table 2A-1 lists the disk partition information for the Training System Server (tsserver). Table 2A-2 lists the disk partition information for the Instructor and Student Workstations.
- 2A-3. The first column identifies the partition. The second column provides the starting cylinder number. The third column lists the number of blocks for each partition. The fourth column tells how the partition listed in the first column is used. The fifth column lists the slot number where the card containing the partition is located.

Table 2A-1. Training System Server (tsserver)

| PARTITION | STARTING CYLINDER | NUMBER OF BLOCKS | USAGE | LOCATION |
|-----------|----------------------|---------------------|---------------------|----------|
| c0t0d0s0 | 2904 | 2904 | 1 | slot 0 |
| c0t0d0s1 | 0 | 1452 | swap | slot 0 |
| c0t0d0s3 | 5808 | 1 | metadb | slot 0 |
| c0t0d0s4 | 1452 | 1452 | swap | slot 0 |
| c0t0d0s6 | 5809 | 75 | /raid5 trans log | slot 0 |
| c0t0d0s7 | 5884 | 18736 | /export | slot 0 |
| c0t1d0s3 | 0 | 1 | metadb | slot 1 |
| c0t1d0s7 | 1 | 24619 | /ora1 | slot 1 |
| c0t2d0s3 | 0 | 1 | metadb | slot 2 |
| c0t2d0s7 | 1 | 24619 | hot spare | slot 2 |
| c0t3d0s3 | 0 | 1 | metadb | slot 3 |
| c0t3d0s7 | 1 | 24619 | stripe of /raid5 | slot 3 |

Table 2A-1. Training System Server (tsserver) (Cont)

| PARTITION | STARTING CYLINDER | NUMBER OF BLOCKS | USAGE | LOCATION |
|-----------|----------------------|---------------------|----------------------|----------|
| c2t0d0s0 | 2904 | 2904 | /* | slot 12 |
| c2t0d0s1 | 0 | 1452 | swap* | slot 12 |
| c2t0d0s3 | 5808 | 1 | metadb | slot 12 |
| c2t0d0s4 | 1452 | 1452 | swap* | slot 12 |
| c2t0d0s6 | 5809 | 75 | /raid5 trans log* | slot 12 |
| c2t0d0s7 | 5884 | 18736 | /export* | slot 12 |
| c2t1d0s3 | 0 | 1 | metadb | slot 13 |
| c2t1d0s7 | 1 | 24619 | /ora1* | slot 13 |
| c2t2d0s3 | 0 | 1 | metadb | slot 14 |
| c2t2d0s7 | 1 | 24619 | stripe of /raid5 | slot 14 |
| c2t3d0s3 | 0 | 1 | metadb | slot 15 |
| c2t3d0s7 | 1 | 24619 | stripe of /raid5 | slot 15 |
| c3t0d0s3 | 0 | 1 | metadb | slot 16 |
| c3t0d0s7 | 1 | 24619 | /ora2 | slot 16 |
| c3t1d0s3 | 0 | 1 | metadb | slot 17 |
| c3t1d0s7 | 1 | 24619 | /ora3 | slot 17 |
| c3t2d0s3 | 0 | 1 | metadb | slot 18 |
| c3t2d0s7 | 1 | 24619 | stripe of /raid5 | slot 18 |
| c3t3d0s3 | 0 | 1 | metadb | slot 19 |
| c3t3d0s7 | 1 | 24619 | stripe of /raid5 | slot 19 |

Table 2A-1. Training System Server (tsserver) (Cont)

| PARTITION | STARTING CYLINDER | NUMBER OF BLOCKS | USAGE | LOCATION |
|-----------|----------------------|---------------------|---------------------|----------|
| c4t0d0s3 | 0 | 1 | metadb | slot 4 |
| c4t0d0s7 | 1 | 24619 | /ora2* | slot 4 |
| c4t1d0s3 | 0 | 1 | metadb | slot 5 |
| c4t1d0s7 | 1 | 24619 | raid0 | slot 5 |
| c4t2d0s3 | 0 | 1 | metadb | slot 6 |
| c4t2d0s7 | 1 | 24619 | stripe of /raid5 | slot 6 |
| c4t3d0s3 | 0 | 1 | metadb | slot 7 |
| c4t3d0s7 | 1 | 24619 | stripe of /raid5 | slot 7 |
| c5t0d0s3 | 0 | 1 | metadb | slot 8 |
| c5t0d0s7 | 1 | 24619 | /ora3* | slot 8 |
| c5t1d0s3 | 0 | 1 | metadb | slot 9 |
| c5t1d0s7 | 1 | 24619 | /raid0* | slot 9 |
| c5t2d0s3 | 0 | 1 | metadb | slot 10 |
| c5t2d0s7 | 1 | 24619 | stripe of /raid5 | slot 10 |
| c5t3d0s3 | 0 | 1 | metadb | slot 11 |
| c5t3d0s7 | 1 | 24619 | stripe of /raid5 | slot 11 |

^{*} mirror

Table 2A-2. Instructor and Student Workstations (instructor, student1-student6)

| PARTITION | STARTING CYLINDER | NUMBER OF BLOCKS | USAGE | LOCATION |
|-----------|----------------------|---------------------|---------|---------------------|
| c0t0d0s0 | 0 | 8323 | 1 | internal, rear slot |
| c0t0d0s1 | 8323 | 6242 | swap | internal, rear slot |
| c0t0d0s7 | 2043 | 24968 | /export | internal, rear slot |